DEVOTED TO RESEARCH AND CLINICAL STUDY OF THE DISEASES AND PROCESSES OF THE AGED AND AGING

Geriatrics

Official Journal of the AMERICAN GERIATRICS SOCIETY

VOLUME I March - April 1946 NUMBER 2

when secondary anemia threatens the older patient

'Lirimin' Capsules provide the geriatrician with an effective therapeutic agent for the oral treatment of secondary anemias and certain forms of nutritional deficiency diseases.

Chronic hemorrhage, a frequent cause of iron-deficiency anemia, is characteristic of hemorrhoids, gastrointestinal ulceration and hookworm infestation. Moreover, dietary inadequacy or diminished absorption from the alimentary tract may reduce the supply of elements necessary for normal red blood cell and hemoglobin regeneration. The administration of 'Lirimin' Capsules is indicated in each of these conditions. Each capsule contains: Ferrous sulfate, exsiccated, 0.3 Gm.; Thiamine hydrochloride (Vitamin B_1), 0.25 mg.; Riboflavin (Vitamin B_2 or G), 0.5 mg.; Liver-Yeast concentrate, 0.25 Gm., together with other natural factors of Vitamin B-complex derived from the liver-yeast component. Supplied in vials of 100 capsules. Sharp & Dohme, Philadelphia 1, Pa.

SHARP & DOHME

'LIRIMIN' *Capsules*

FERROUS SULFATE WITH LIVER-YEAST CONCENTRATE AND THE VITAMIN B-COMPLEX

Official Journal of the American Geriatrics Society

EDITORIAL BOARD

A. E. HEDBACK, M.D., *Editor*

Associate Editors

EDWARD B. ALLEN, M.D., White Plains, New York
HAVEN EMERSON, M.D., New York City
JONATHAN FORMAN, M.D., Columbus, Ohio
WINGATE M. JOHNSON, M.D., Winston-Salem, North Carolina
NORMAN JOLLIFFE, M.D., New York City
FOSTER KENNEDY, M.D., New York City
GEORGE W. KOSMAK, M.D., New York City
CHAUNCEY D. LEAKE, Ph.D., Galveston, Texas
OSWALD SWINNEY LOWSLEY, M.D., New York City
J. A. MYERS, M.D., Minneapolis, Minnesota
GEORGE E. PFAHLER, M.D., Philadelphia, Pennsylvania
E. A. ROVENSTINE, M.D., New York City
MALFORD W. THEWLIS, M.D., Wakefield, Rhode Island
E. L. TUOHY, M.D., Duluth, Minnesota
WALTER E. VEST, M.D., Huntington, West Virginia
MAURICE B. VISSCHER, M.D., Minneapolis, Minnesota
S. MARX WHITE, M.D., Minneapolis, Minnesota

OFFICERS OF THE AMERICAN GERIATRICS SOCIETY

WINGATE M. JOHNSON, M.D., *President*
WALTER E. VEST, M.D., *First Vice President*
EDWARD B. ALLEN, M.D., *Second Vice President*
MALFORD W. THEWLIS, M.D., *Secretary*
RICHARD J. KRAEMER, M.D., *Treasurer*

Because...

"the diagnosis 'senility' has largely been replaced by a diagnosis of a cardiovascular condition"*

CORAMINE LIQUID

FOR ORAL ADMINISTRATION

ELDERLY PATIENTS with cardiovascular impairment can be adequately managed and given continuing relief from respiratory embarrassment with Coramine liquid therapy.

Employed alone or as supportive treatment, 20-60 minims t.i.d. is the average dose mentioned throughout the literature by clinicians reporting "good results".

Specifically, in chronic coronary disease and in cases of cardiac decompensation with dyspnea, Coramine liquid administered orally affords marked relief. While the results are not as dramatic as when Coramine is given parenterally in an emergency, the progressive improvement of the cardiac patient is highly gratifying.

Issued in bottles of ½, 1½, and 3 fl. oz.

*Boas, E. P.: Treatment of the Patient Past Fifty, The Year Book Publishers, Inc., Chicago, 1941, p. 61.

CORAMINE—*Trade Mark Reg. U. S. Pat. Off.*

Ciba

CIBA PHARMACEUTICAL PRODUCTS, INC.
SUMMIT, NEW JERSEY

VOL. I, NO. 2

CONTENTS

MARCH-APRIL 1946

Normal Blood Pressure in Senescence: A Study of 3691 White Male Subjects between the Ages of 50 and 95 Years, HENRY I. RUSSEK, M.D., F.A.C.P., AND BURTON L. ZOHMAN, M.D., F.A.C.P. 113

Transurethral Prostatic Resection on Elderly Patients . . . . . THOMAS L. POOL, M.D. 121

Pancreatitis in Geriatric Practice, WINGATE M. JOHNSON, M.D., F.A.C.P. AND O. T. DAVIS, M.D. 125

Guillain-Barré's Disease in the Older Age Group . . . . . A. B. BAKER, M.D. 132

The Senile and Prematurely Senile Skin . F. RONCHESE, M.D. 144

Some Prophylactic Suggestions regarding the Science of Geriatrics . . . . . W. RANEY STANFORD, M.D., F.A.C.P. 147

Cardiovascular Deterioration . HENRY L. ULRICH, M.D., F.A.C.P. 152

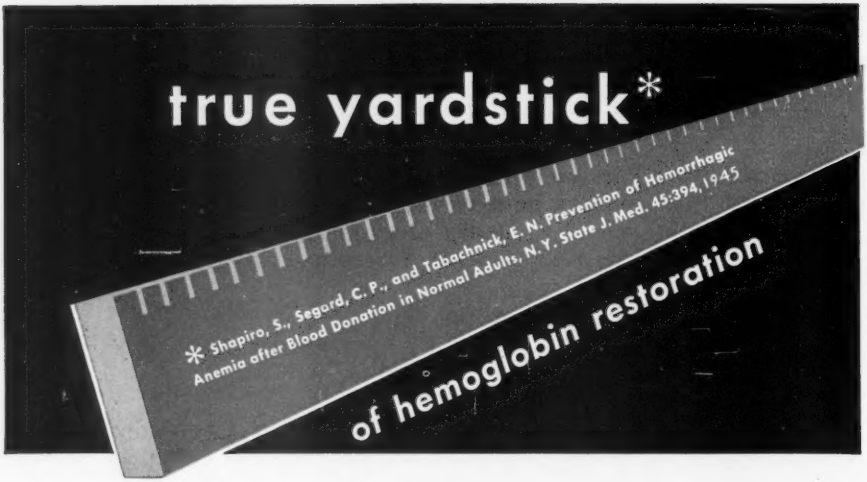
A New Method of Local Treatment of Rheumatoid and Traumatic Affections of the Joints . OTTO C. KESTLER, M.D. 159

Editorials 164

Digests from Current Literature 168

GERIATRICS is published bimonthly at Minneapolis. Publication dates: January, March, May, July, September, November. Subscription rates: $3.00 a year, 50 cents a copy; foreign, $4.00 a year, 75 cents a copy. Address all editorial and business correspondence to GERIATRICS, 84 South Tenth Street, Minneapolis 2, Minnesota.

ADVERTISING REPRESENTATIVES. NEW YORK 17: George Doyle, Arthur Young, 1 East 42d Street, Suite 801, Corn Exchange Building. Telephone: Murray Hill 2-8717. CHICAGO 11: Jay H. Herz, 43 East Ohio Street. Telephone: Superior 8843. CLEVELAND 14: Bernard A. Smiler, 1125 Fidelity Building. Telephone: Main 3619. SAN FRANCISCO 4: Duncan A. Scott & Co., Mills Building. Telephone: Sutter 1393. LOS ANGELES 15: Duncan A. Scott & Co., 408 Pershing Square Building, 448 South Hill Street. Telephone: Michigan 0921. Copyright 1946 by MODERN MEDICINE PUBLICATIONS. Title Reg. U.S. Pat. Off. Application for entry as second class matter is pending at Post Office, Minneapolis, Minnesota.


true yardstick*
of hemoglobin restoration
* Shapiro, S., Segard, C. P., and Tabachnick, E. N. Prevention of Hemorrhagic Anemia after Blood Donation in Normal Adults, N. Y. State J. Med. 45:394, 1945

Eleven of 15 "white collar workers" in good health and on adequate diet experienced a precipitous depression in blood hemoglobin averaging 14% following blood donation of 500 cc. The period of hemoglobin restoration could be shortened one-third by giving Licuron-B after donation of blood but only one-sixth by giving ferrous sulfate. If Licuron-B was also given prophylactically it prevented or minimized hemorrhagic anemia but larger doses of ferrous sulfate did not obtain this beneficial effect.*

Licuron-B is the bi-active antianemic. (1) It provides the copper-iron ratio which is basic therapy in hypochromic anemia. (2) It raises the nutritional status of the patient with liver B-vitamins augmented by the crystalline vitamins thiamine, riboflavin and niacinamide. Licuron-B is supplied in sugar coated tablets. Lakeside Laboratories, Milwaukee 1, Wisconsin

***Reprints of this article will be sent upon request.**

LIC. 458

Licuron-B

LIVER COPPER IRON B-COMPLEX

NORMAL BLOOD PRESSURE IN SENESCENCE:

A STUDY OF 3691 WHITE MALE SUBJECTS BETWEEN THE AGES OF 50 AND 95 YEARS

Henry I. Russek, M.D., F.A.C.P., and Burton L. Zohman, M.D., F.A.C.P.

RECOGNITION of pathologic states as well as correct understanding of normal physiology are dependent upon a clear perception of the range of normal human physiologic measurements. Particularly in the older patient, in whom the effects of disease are often confused with involuntionary changes common to senescence, is there great need for standards. This paper considers the existent concepts of normal blood pressure in physiologic old age.

Most statistics concerning the variations of blood pressure with age are based upon analyses of comparatively young adults. Frequently the number of elderly subjects in such studies was too small to assign statistical significance to differences noted with advancing years. All authorities agree, however, that the average blood pressure of unselected groups increases with age.

Bowes (1), in a study of blood pressure in 150 subjects, observed that the average systolic level of the men rose from 145 mm. in the 60- to 65-year-old group to 163 mm. in the 80- to 84-year-old group. Lewis (2) noted that the greatest rise in systolic pressure occurred after the age of 65 years. Average diastolic pressure, on the other hand, showed little variation with age. Miller's (3) study of 853 men also revealed an increase in average systolic pressure, the level rising from 132 mm. in the 50- to 54-year-old group to 157 mm. in the 85- to 89-year-old group. One of us (4) in a study of 1000 aged seamen, noted that the average systolic pressure increased from 147 mm. in the 60- to 64-year-old group to 160 mm. in the 85- to 95-year-old group, while the average diastolic pressure varied little after the age of 65 years.

Thus, while these findings are in agreement as to the trends of average blood pressure in groups comprising both normal and hypertensive persons, considerable difference of opinion exists regarding the influence of age upon average levels of exclusively normal groups.

It has long been assumed by many physicians that normal blood pressure is higher in senescence than in earlier life, based on the old adage that systolic pressure equals 100 plus the age in years. More recently, however, many authorities have asserted that normal blood pressure in old age is not appreciably different from levels found in presenescence. Embracing this view, Stieglitz (5) advises that "we may consider 140/90 as the maximum normal blood pressure irrespective of age . . ." Alvarez and Stanley (6) similarly maintain that a systolic pressure of 115 mm. is just as normal, and one of 140 mm. just as

DR. HENRY I. RUSSEK is Cardiologist and Director of Cardiovascular Research at the U. S. Marine Hospital, Staten Island, New York. DR. BURTON L. ZOHMAN is Consultant Cardiologist at the Brooklyn State and U. S. Marine hospitals. This paper, submitted from the Cardiovascular Research Division of the U. S. Marine Hospital, Staten Island, New York, is published with the permission of the Surgeon General of the United States Public Health Service.

abnormal, for an old man as a young one. Allen (7), Huber (8), Faught (9), and others characterize a systolic blood pressure above 140 mm. as "unsafe at any age." In the last fifteen years, therefore, a systolic level of 140 mm. Hg. has been designated by many authors as the highest acceptable limit of the normal, irrespective of age.

Robinson and Brucer (10), moreover, are of the opinion that even this level is far too liberal in delimiting physiologic from abnormal readings. From their studies they concluded that the range of normal blood pressure is "as immutable and as constant as the temperature and pulse rate." Consequently, they regard levels of systolic blood pressure above 120 mm. Hg. at any age as definitely in the zone of hypertension.

This wide divergence of authoritative opinion may be traced to two main influences. Older concepts were apparently based upon the assumption that averages derived from the study of mixed groups, comprising hypertensive as well as normal persons, are acceptable as standards of normal blood pressure. Indeed, some of our textbooks of physiology and medicine present values for normal blood pressure at various ages in terms of such distorted data. On the other hand, insurance mortality statistics appear to be largely responsible for the recent more conservative trends. These compilations, undertaken not as a study of human physiology but "for actual use in a great business," have supposedly demonstrated that pressures over 140 mm. systolic are definitely associated with a proportionately increased death rate. While this sweeping assertion has been held applicable to all age groups, examination of the data from these sources generally reveals only limited justification for this view. Thus, persons over the age of 60 are frequently not represented in such analyses, or comprise too small a group to warrant any definite conclusions.

Consequently, while there is no real evidence that elevation of the systolic blood pressure is abnormal in senescence, does support exist for the view that such elevation may actually be physiologic? In previous reports (11, 12), based upon studies employing the cold-pressor test, we pointed out that differences exist in the reactibility of the blood pressure at different ages. Using this test as an index of vascular reactibility, we noted that the stimulus of cold produced a progressive increase in the response of the blood pressure of all subjects with advance of age. The increasing response was observed not only in hyperreactors but also in normal reactors.

It follows, therefore, that since the act of measuring the blood pressure serves as a "psychic-pressor test," one might expect from this influence alone progressively higher averages for normal blood pressure with advancing years. It is also well known that diminution in the elasticity of the aorta and its large branches occurs with age and frequently gives rise to "hypertension" of the systolic variety (high systolic with normal or low diastolic pressure). However, it has not been clearly established whether these changes are the result of atherosclerosis, and as such represent an abnormal state, or are merely a reflection of the physiologic deterioration of elastic tissue with age.

On the other hand, Robinson and Brucer (10) have attempted to show that normal blood pressure does not increase with advancing years. In order to eliminate the obviously hypertensive persons from their series they excluded blood

pressures of 140/90 and over. They admitted that this level was chosen because, in the group so selected, no increase in average blood pressure was observed with age. In Treloar's (13) opinion this manipulation was actually "a means of forcing a desired result." By such delimitation Robinson and Brucer emphasized that they excluded only 13.3 per cent of over 11,000 persons in their series.

It is noteworthy, however, that only a very small percentage of this number belonged to the older age groups. Other studies, furthermore, have shown a high incidence in senescence of levels which exceed 140/90. Thus, one of us (4) observed that 64 per cent of 1000 elderly seamen had blood pressures in excess of this limit. Only 13 per cent of this entire series, moreover, would have qualified as normal according to Robinson and Brucer's definition (systolic, 120 mm. or less). Similarly, the observations of Master and his associates (14) indicate that 75 per cent of persons 70 years old and older have systolic blood pressures above 140 mm.

Current opinions regarding the trend of normal diastolic pressure with age, when subjected to critical review, seem to lack the support of statistical evidence. Although most authorities accept small increments in the diastolic pressure with advancing years as physiologic, such a view appears to be unfounded. Even the studies of mixed groups of elderly subjects, comprising both hypertensive and normal persons, indicate little or no variation in average diastolic blood pressure with age. These findings are particularly significant in view of a known increase in the incidence of hypertensive disease with succeeding decades (3, 4, 14).

It is true, however, that increasing reactibility of the blood pressure accompanying aging (11, 12) might be expected to result in progressively higher averages for normal diastolic blood pressure in consecutively older age groups. Nevertheless, we have shown that average normal diastolic pressure tends to fall rather than rise with advancing years (4). This change probably results from the progressive loss of the elastic recoil of the aorta and its large branches inherent in the aging process. Diminished elasticity with resultant loss of distensibility of these vessels also accounts for the concomitant rise in systolic blood pressure previously noted.

In an attempt to evaluate further the various concepts concerning normal blood pressure in old age and to clarify the confused state of knowledge concerning this subject, we have studied an unselected group of white males of advanced age.

MATERIAL FOR STUDY

The blood pressure levels of 3691 white men between the ages of 50 and 95 years were analyzed. Althqugh the word "elderly" generally refers to persons 60 years old or older, we have intentionally included a 50- to 59-year-old group for purposes of comparison. The subjects were observed at the U. S. Marine Hospital and Sailors Snug Harbor, both at Staten Island, New York; the U. S. Public Health Service Dispensary, Washington, D. C.; and the New York City Farm Colony, Staten Island, New York. The material appears to represent a fair cross section of the male population.

RESULTS

Table 1 presents an analysis of average systolic and average diastolic

blood pressure* by five- and ten-year intervals. It is seen that average systolic blood pressure increased from 138.9 mm. in the 50- to 54-year-old group to 164.0 mm. in the 85- to 95-year-old group. These changes were found to be statistically significant. Average diastolic blood pressure, on the other hand, showed no significant elevation with advancing years. Average pulse pressure increased progressively with age.

TABLE 1

AVERAGE SYSTOLIC AND DIASTOLIC BLOOD PRESSURE OF MALE SUBJECTS 50 TO 95 YEARS OF AGE

Age (Years)	No. Cases	Average Systolic Blood Pressure (*mm. Hg.*)	T*	Average Diastolic Blood Pressure (*mm. Hg.*)	T	Average Pulse Pressure (*mm. Hg.*)
50-54	767	138.9±0.82†	...	87.0±0.42	...	51.9
55-59	647	142.4±1.02	2.6	87.7±0.57	1.0	54.7
60-64	566	147.7±1.16	3.4	87.6±0.60	0.0	60.1
65-69	558	154.2±1.22	4.1	88.5±0.67	0.9	65.7
70-74	402	155.1±1.37	1.6	87.0±0.72	1.4	68.1
75-79	370	160.6±1.31	2.6	88.2±0.88	1.1	72.4
80-84	255	160.4±1.65	0.0	86.8±0.95	1.1	73.6
85-95	126	164.0±2.22	1.5	90.0±1.26	1.5	74.0
50-59	1414	140.8±0.64	...	87.4±0.35	...	53.4
60-69	1124	150.8±0.84	9.5	88.1±0.50	1.2	62.7
70-79	772	158.6±0.96	6.1	87.6±0.57	0.5	71.0
80-95	381	161.7±1.34	1.8	87.9±0.78	0.5	73.8

*T, as employed in this and the other tables, represents the number of times the observed difference between an average or proportion of one age group and that of the preceding age group is greater than the standard error of that difference.

†These values are standard errors.

Table 2 demonstrates the percentage of persons in each age group having "normal" blood pressure (149/95 or less), systolic hypertension (systolic, 150 mm. or over; diastolic, 95 mm. or less), and diastolic hypertension (diastolic, 96 mm. or over). The incidence of "normal" blood pressure shows a steady and progressive fall in successively older groups, decreasing from 74.8 per cent in the 50- to 54-year-old group to 27.8 per cent in the 85- to 95-year-old group.

In striking contrast, one observes a marked increase in the frequency of systolic hypertension, namely, from 11.5 per cent to 45.2 per cent in the same age interval. This "type" of blood pressure was the most common after the age of 75 years. Analysis of the incidence of diastolic hypertension reveals no significant increment when five-year age intervals are considered, but analysis by ten-year periods shows a real increase between the sixth and seventh decades. Figure 1 illustrates graphically the variations in incidence of "normal" blood pressure, systolic hypertension, and diastolic hypertension with age.

Table 3 shows the tendency of "normal" systolic blood pressure to rise in successively older age groups. Thus, average "normal" systolic blood pressure increased progressively from 129.6 mm. in the 50- to 59-year group to 134.1 mm. in the 80- to 95-year group. Average "normal" diastolic pressure, on the contrary, showed a tendency to fall with age, as indicated by a decrease in the average level from 80.1 mm. in the 50- to 59-year group to 74.5 mm. in the 80- to 95-year group.

*The level at the beginning of the 4th phase was taken as the reading of diastolic blood pressure.

TABLE 2

PERCENTAGE INCIDENCE OF "NORMAL" BLOOD PRESSURE, SYSTOLIC HYPERTENSION, AND DIASTOLIC HYPERTENSION

Age (Years)	"Normal" Blood Pressure		Systolic Hypertension		Diastolic Hypertension	
	Per Cent	T	Per Cent	T	Per Cent	T
50-54	74.8	...	11.5	...	13.7	...
55-59	68.2	2.7	14.7	1.8	17.1	1.8
60-64	57.9	3.7	22.8	3.6	19.3	0.9
65-69	47.8	3.4	31.0	3.1	21.1	0.8
70-74	43.0	1.4	38.3	2.3	18.7	1.0
75-79	35.1	2.2	43.0	1.3	21.9	1.1
80-84	36.1	0.2	44.3	0.1	19.6	0.8
85-95	27.8	1.6	45.2	0.1	27.0	1.6
50-59	71.8	...	12.9	...	15.3	...
60-69	52.9	9.9	26.9	8.7	20.2	3.2
70-79	39.2	6.0	40.5	6.1	20.2	0.0
80-95	33.3	2.0	44.6	3.6	22.0	0.7

TABLE 3

"NORMAL" BLOOD PRESSURE GROUP

Age (Years)	No. Cases	Average Systolic Blood Pressure (*mm.*)	T	Average Diastolic Blood Pressure (*mm.*)	T	Average Pulse Pressure (*mm.*)
50-59	1015	129.6±0.38	...	80.1±0.26	...	49.5
60-69	595	130.2±0.55	0.9	76.8±0.39	7.4	53.4
70-79	303	133.7±0.87	3.4	75.7±0.60	1.5	58.0
80-95	127	134.1±1.0	0.3	74.5±0.93	1.0	59.6

Age (Yrs.)	Systolic Blood Pressure 140-149 mm. (Per Cent)	T	Diastolic Blood Pressure 90-95 mm. (Per Cent)	T	Below 70 mm. (Per Cent)	T	120/80 or Less (Per Cent)	T
50-59	24.4	...	14.4	...	6.4	...	29.0	...
60-69	28.2	3.0	12.2	1.3	15.1	5.2	32.1	1.3
70-79	36.3	2.4	15.1	1.5	20.1	1.7	26.0	1.9
80-95	40.9	0.9	15.7	0.2	21.2	0.3	26.7	0.0

The following significant trends in "normal" systolic and diastolic blood pressure with age are evident: (1) An increase occurs in the frequency of systolic blood pressures in the upper range of "normal" (140 to 149 mm.); (2) the incidence of diastolic blood pressure levels below 70 mm. increases significantly; (3) no change is observed in the frequency of diastolic blood pressure over 90 mm.

These findings suggest that normal systolic blood pressure tends to rise with age, while normal diastolic pressure tends to fall. Furthermore, if the rise in "normal" systolic pressure were due principally to potential hypertensives in the "normal" group, a concomitant rise in "normal" diastolic pressure would be demonstrable. The finding of a decrease in average "normal" diastolic pressure with age, as well as a rising frequency of subjects with low levels of normal, is therefore significant in excluding this possibility. Furthermore, the progressive rise in normal systolic pressure and the progressive fall in normal diastolic pressure correlate well with increasing systolic hypertension with age.

DISCUSSION

This study strongly suggests that a physiologic rise in normal systolic blood pressure occurs with advance in age. Although Robinson and Brucer (10) con-

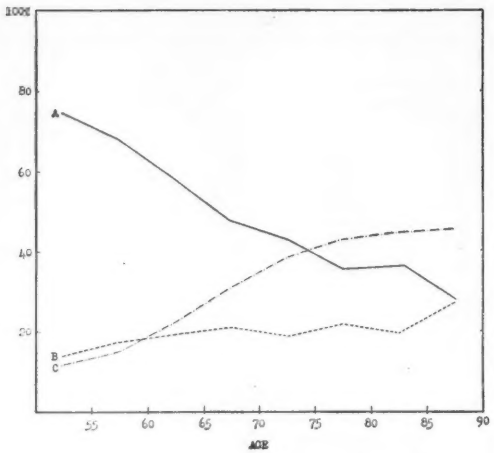


Fig. 1. Showing the relationship of age to percentage incidence of "normal" blood pressure (A), diastolic hypertension (B), and systolic hypertension (C).

tended that their observations did not confirm this view, our examination of their data indicates a significant rise with age in the frequency of systolic blood pressures in their upper range of "normal" (130 to 139 mm.). Furthermore, these authors acknowledged that 10 per cent of the population who showed a rise in pressure during a period of observation had previously manifested relatively low levels of normal (120 mm. or less).

Our analysis indicates not only that the percentage of persons with systolic pressure in the upper range of "normal" (140 to 149 mm.) increases appreciably with age, but also that the percentage with diastolic pressures in the lower range of normal (below 70 mm.) reveals a similar trend. Robinson and Brucer also noted a rising incidence of low diastolic levels after the age of 55 years, but admitted that they were unable to account for this variation.

From these considerations it seems likely that the same mechanism which underlies systolic hypertension in the aged is responsible for the changes we have noted in normal levels. More specifically, diminution in the elasticity of the aorta and its large branches may result not only in an increase in normal systolic pressure, with a concomitant decrease in the diastolic level, but also in systolic hypertension when these changes are pronounced. Many authors attribute the development of systolic hypertension to arteriosclerosis of these vessels.

However, Herringham and Wills (15) and others have shown that the elasticity of arteries diminishes progressively with advancing years, becoming particularly marked with the fifth decade. Although loss of elasticity is frequently accepted as synonymous with atherosclerosis, it has been emphasized that many elderly persons have vessels with little elasticity remaining, but no atherosclerosis. Contrariwise, extensive sclerotic changes may be present even in young persons without significant loss of elasticity (16).

Systolic hypertension, therefore, in older people may represent merely the hemodynamic reflection of normal vascular aging. Considered in this light, these changes may be compared to the physiologic alterations occurring in the hair, skin, skeleton, and other structures with advancing age. Clinical support for this view is found in the observations of Fineberg (17), Boas (18), and others, who are of the opinion that systolic hypertension does not influence health or longevity. Further confirmation is offered by life expectancy studies (4) previously reported, and by the high incidence of systolic hypertension in senescence, and particularly in extreme old age (3, 4). In the present study we noted that systolic hypertension was the most frequent "type" of blood pressure encountered in subjects over the age of 75 years. It seems evident from these findings that hypertensive disease in older persons cannot be defined solely in terms of the systolic blood pressure.

Wiggers (19) is of the opinion that in some cases systolic hypertension may actually represent long-standing diastolic hypertension complicated by sclerosis and rigidity of the aorta. We have noted this type of genesis in three patients under observation for twenty or more years, but consider it to be uncommon. If it be accepted, therefore, that systolic hypertension is usually a normal finding in later life, the old dictum "100 plus the age" may regain its former prestige as an index of normal systolic blood pressure.

Employment of 140 mm. as the upper limit of normal systolic pressure, as advocated by others, would have excluded more than two thirds of all our subjects over the age of 60 years.

The tendency for normal diastolic blood pressure to fall with age is partially counterbalanced by the increase in vascular reactibility attending the aging process (11, 12, 20). After making allowance for the psychic-pressor effect of the initial measurement of the blood pressure by repeating the procedure once or twice at brief intervals, the reading obtained in physiologic old age probably never exceeds 85 mm. Our data suggest that the upper limit of normal diastolic pressure is not higher, but in all probability somewhat lower, in senescence than in earlier life.

SUMMARY AND CONCLUSIONS

Numerous concepts exist regarding normal standards of blood pressure in senescence. Opinions vary from the extreme view that normal blood pressure does not exceed 120/80 at any age to the old and deeply rooted formula that normal blood pressure equals "100 plus the age." Examination of the evidence upon which these views are based reveals in many instances inconclusive data or unwarranted assumptions.

Statistical analyses of the blood pressure levels of 3691 white male subjects between the ages of 50 and 95 years are presented. The variations in blood pressure with age and the deductions drawn therefrom are as follows:

1. Average systolic blood pressure, when all levels are considered, increases significantly with age, whereas average diastolic blood pressure varies little after the sixth decade.

2. The incidence of "normal" blood pressure (149/95 or less) decreases markedly with age, so that less than half (45.0 per cent) of the subjects 60 years old or older belong to this group.

3. The frequency of systolic hypertension increases sharply, becoming the most common "type" of blood pressure encountered after the age of 75 years. Approximately one third of our subjects 60 years of age and over manifest such elevation.

4. The incidence of diastolic hypertension rises between the sixth and seventh decades and remains relatively unchanged thereafter.

5. Normal systolic blood pressure tends to rise with age; conversely, normal diastolic blood pressure shows a tendency to fall. These changes are explained by the progressive diminution in the elasticity of the aorta and its large branches associated with the process of aging.

6. The same physiologic mechanism is responsible for the increasing incidence of systolic hypertension, which is merely the hemodynamic reflection of normal vascular aging.

7. Hypertensive disease in senescence cannot be defined solely in terms of the systolic blood pressure.

8. The old dictum "100 plus the age" appears to be a fair index of normal systolic blood pressure.

REFERENCES

1. Bowes, L. M.: Blood Pressure in the Aged: A Study of 150 Cases from 65 to 95 Years of Age. J. Lab. & Clin. Med, 2:256, 1917.
2. Lewis, W. H., Jr.: Changes with Age in Blood Pressures of Adult Men. Am. J. Physiol., 122:491, 1938.
3. Miller, I.: Blood Pressure Studies in the Aged. New York State J. Med., 41:1631, 1941.
4. Russek, H. I.: Blood Pressure in the Aged: A Study of One Thousand Elderly Male Subjects. Am. Heart J., 26:11, 1943.
5. Stieglitz, E. J.: Abnormal Arterial Tension. New York: National Medical Book Company, 1935.
6. Alvarez, W. C., and Stanley, L. L.: Blood Pressure in Six Thousand Prisoners and Four Hundred Prison Guards; Statistical Analysis. Arch. Int. Med., 46:17, 1930.
7. Allen, E. V., *in* Musser, J. H.: Internal Medicine. 3d ed. Philadelphia: Lea and Febiger, 1938.
8. Huber, E. G.: Systolic and Diastolic Blood Pressure in Healthy Men. Human Biol., 5:542, 1933.
9. Faught, F. A.: Simple Method for Determining Normal Average Systolic Blood Pressure at any Age. Med. J. & Rec., 135:160, 1932.
10. Robinson, S. C., and Brucer, M.: Range of Normal Blood Pressure; Statistical and Clinical Study of 11,383 Persons. Arch. Int. Med., 64:409, 1939.
11. Russek, H. I.: The Significance of Vascular Hyperreaction as Measured by the Cold-Pressor Test. Am. Heart J., 26:398, 1943.
12. Russek, H. I., and Zohman, B. L.: Influence of Age upon Blood Pressure Response to the Cold-Pressor Test. Am. Heart J., 29:113, 1945.
13. Treloar, A. E.: Normal Blood Pressure. Arch. Int. Med., 66:848, 1940.
14. Master, A. M., Marks, H. H., and Dack, S.: Hypertension in People Over Forty. J. A. M. A., 121:1251, 1943.
15. Herringham, W. P., and Wills, W. A.: On the Elasticity of the Aorta: Being a Contribution to the Study of Arterial Sclerosis. Med.-Chir. Trans., 69:489, 1904.
16. Page, I. H.: Arteriosclerosis and Lipid Metabolism. In Ageing and Degenerative Diseases. Biol. Symposia, 11:43, 1945. Lancaster, Pa.: Jaques Cattell Press.
17. Fineberg, M. H.: Systolic Hypertension: Its Relationship to Atherosclerosis of Aorta and Larger Arteries. Am. J. M. Sc., 173:835, 1927.
18. Boas, E. P.: Treatment of the Patient Past Fifty. Rev. ed. Chicago: The Year Book Publishers, 1944.
19. Wiggers, C. V.: Dynamics of Hypertension. Am. Heart J., 16:512, 1938. Basic Hemodynamic Principles Essential to Interpretation of Cardiovascular Disorders; Ludwig Kast Lecture. Bull. New York Acad. Med., 18:3, 1942.
20. Russek, H. I., Rath, M. M., Zohman, B. L., and Miller, I.: Age and Normal Blood Pressure; A Study of 5331 White Male Subjects. To be published.

TRANSURETHRAL PROSTATIC RESECTION ON ELDERLY PATIENTS

Thomas L. Pool, M. D.

As THE span of life lengthens it becomes apparent that more and more men reach the age at which prostatic enlargement is most likely to occur. Formerly prostatic enlargement was a serious threat to the life of an elderly man. Prostatic enlargement can still be viewed with respect, but it has been demonstrated that with skill and proper management men in the older age groups can be treated with minimal risk by means of transurethral resection. Seldom is it necessary to withhold this benefit simply because of the advanced age of the patient. At present the number of men who have to wear a suprapubic cystostomy tube or use a catheter for the rest of their lives is smaller than it was before transurethral resection was being performed.

Naturally, it must be realized that in elderly men there are complicating factors to be considered. General debility, as well as such specific disease entities as cardiovascular accidents, are factors that must be recognized and faced. It is of interest, however, that age itself offers no serious danger. All surgeons have seen active men 90 years of age who are much better surgical risks than the patient 50 years of age who for some reason has been inactive. This is particularly true when a resection is to be carried out after some other surgical procedure. In such cases it is usually advisable to wait more than two weeks and get the patient up and about before attempting to resect the prostate gland. Likewise, after such an accident as coronary thrombosis it is advisable to wait perhaps three months, if possible, before performing the operation.

It has been shown that the incidence of carcinoma of the prostate definitely increases with age. Some authors believe that all men would eventually die of carcinoma of the prostate gland if they lived long enough. Why carcinoma should affect a man 50 years of age but fail to affect another man 90 years of age is still a question. It will probably remain unanswered for some time.

PREOPERATIVE CARE

The preoperative care of these patients is of the utmost importance. Skill and judgment are just as important in preoperative treatment as in operative treatment. All patients should be observed by a competent medical consultant before the operation. Co-operation between the medical staff and the surgical staff is desirable; it not only lowers the incidence of complications but also decreases the mortality.

DR. THOMAS LLOYD POOL is a staff member of the Section on Urology of the Mayo Clinic. He is Instructor in Urology of the Mayo Foundation Graduate School, University of Minnesota, and a member of the American Medical Association and the North Central Branch of the American Urological Association.

Because of renal obstruction and the associated renal insufficiency urinary drainage is frequently necessary before prostatic resection. When urinary drainage is necessary it has been found that an indwelling urethral catheter, if properly placed and cared for, is the treatment of choice. The time has passed when suprapubic cystostomy is performed routinely in all cases of prostatic obstruction. It is only in the exceptional case that even a trocar cystostomy is necessary. Even though a large amount of residual urine is present, transurethral resection can be performed without preliminary drainage if the renal function is adequate.

In all cases in which drainage is employed patients should be urged to get out of bed as much as possible. It is often necessary to insist that patients be helped from the bed by a nurse and kept out of bed while they eat a meal. Often, repeated urging by the physician and help from the nursing service are required to keep elderly men up long enough to permit them to gain strength and to prevent the development of so-called "wet lung," which often occurs when patients are confined to bed.

When renal function is reduced the oral ingestion of fluid should be increased. If necessary, fluids should be administered intravenously. Even when hypertension or cardiovascular disease is present the intravenous administration of fluid is not contraindicated, provided the fluid is administered slowly. Not more than 1000 cc. of physiologic salt solution should be administered daily unless the patient is vomiting or is losing an excessive amount of fluid. In most cases a daily intake of 3000 to 4000 cc. of fluid should be adequate; 2000 cc. of this amount may be administered intravenously. If the patient is dehydrated larger amounts of fluid may be necessary.

The urinary output must be watched carefully, especially when the value of the blood urea is increased. In some of these cases the renal damage may have been so extensive that the concentration of urea in the blood will never return to normal, but usually the concentration of urea becomes stabilized at a level above normal and remains there. If the daily output of urine is between 1500 and 2000 cc. transurethral resection can frequently be carried out with only a slight increase in the operative risk.

Many patients have anemia, and studies must be carried out to determine if possible the cause of this condition. Transfusion may be necessary immediately before operation.

In both the preoperative and postoperative periods the carbon dioxide combining power of the plasma should be determined. Bicarbonate of soda should be administered intravenously in all cases in which acidosis is present. It should be administered in doses of 250 cc. of a 5 per cent solution.

Finally, all the complicating factors should be considered before operation is performed. When the operative risk is definitely increased because of debility, coronary disease, or other factors, the situation should be discussed with members of the patient's family before operation is performed. If the family can be made to realize that the patient is not in the best of condition and that his condition will never be better unless operation is performed, criticism will usually be withheld if a postoperative complication occurs.

OPERATIVE CARE

Very few patients who have prostatic obstruction require suprapubic or

perineal prostatectomy. Transurethral resection is definitely the operation of choice when the patient is elderly. If two transurethral procedures are necessary to remove the obstructing tissue the risk is still less than that of the open operation.

At the Mayo Clinic we almost always use the Thompson resectoscope, but we use the Braasch-Bumpus resectoscope in cases that require it. If the urethra is small or if a tight stricture is present, we do not hesitate to insert the resectoscope into the urethra through a midline incision in the bulbous portion of the urethra.

Spinal anesthesia is usually employed. The dose of the anesthetic agent should be no greater than that required to produce adequate anesthesia. When procaine hydrochloride is employed a dose of only 50 mg. may be sufficient if the patient is elderly and not overly heavy. Pentothal sodium may be administered intravenously to supplement the spinal anesthesia, although intravenous anesthesia is not the method of choice.

Every effort must be made to make the operation as short as possible. Forty-five minutes or 60 minutes, at the most, are as long as the elderly patient should be kept on the operating table. If the resection cannot be completed in this time and the bleeding controlled, the patient should be permitted to return to his room and the resection should be completed seven to ten days later. At times it is wise to plan deliberately to do a two-stage operation if the amount of prostatic tissue to be removed is estimated to be more than 100 gm.

At present it is my opinion that all water used for irrigation at the time of operation should be collected in order to determine the amount of blood lost. This procedure will furnish some idea of whether or not a transfusion is needed and is also valuable in helping one to judge what should be done in the postoperative period. If the amount of blood lost is small, fluids rather than blood should be administered; 2000 cc. of a 5 per cent solution of dextrose in distilled water is the fluid of choice. The blood pressure should be watched carefully during the operation and also after the patient has been returned to his bed.

POSTOPERATIVE CARE

At the end of the operation bleeding should be controlled as well as possible. As an added precaution against postoperative hemorrhage I usually insert a two-way balloon catheter and irrigate continuously for the first 24 hours with a 1:10,000 solution of zephiran chloride. Some urologists prefer to use a 26 F. balloon catheter, but I usually use a 24 F. catheter with a pear-shaped bag. Under ordinary circumstances continuous irrigation is discontinued at the end of 24 hours and the large catheter is replaced by a 20 F. balloon catheter. This catheter is removed 72 hours after the operation.

In order to determine the amount of blood that is being lost, the solution used in the continuous irrigation should be collected as it returns through the catheter.

Every patient, unless he has had some postoperative complication, should be up in a chair at the end of 24 hours. The patient should receive an adequate amount of fluid. If he is nauseated and cannot ingest an adequate amount of fluid, intravenous administration of fluid may be necessary.

At the end of 48 hours after operation an erythrocyte count should be made and the values of the hemoglobin and blood urea should be determined. If a large amount of blood has been lost or the urinary output is low, the value for the plasma chlorides and the carbon dioxide combining power of the plasma should also be determined. These tests will help to determine what type of treatment should be employed.

When the catheter is removed at the end of 72 hours the patient usually voids in a satisfactory manner. If micturition is natural and if one is certain that the bladder is not atonic, the checking of the amount of residual urine should be delayed for a few days.

The average period of hospitalization is six to seven days, although many patients are allowed to leave the hospital earlier. No patient is allowed to leave Rochester in less than fourteen days from the date of the operation, because of the possibility of postoperative hemorrhage. Although such hemorrhage is not frequent, it does occur and the bleeding can be brisk.

CARCINOMA OF THE PROSTATE

As stated previously, the incidence of carcinoma of the prostate increases with age. Probably about 20 per cent of the aged patients who have hypertrophy of the prostate will be found to have a carcinoma.

Until a few years ago carcinoma of the prostate gland was considered to be a fatal disease, although many patients lived a number of years after the carcinoma was recognized, particularly when the grade of malignancy was low. In recent years, with the introduction of bilateral orchectomy and hormonal therapy, the outlook has become more favorable. The exact value of orchectomy and hormonal therapy cannot be ascertained at present. Extensive studies are still being made on this phase of the subject.

In my opinion few if any patients who have carcinoma of the prostate are suitable for radical operation. At the clinic it is our policy to perform transurethral resection when the obstructive symptoms are severe or when there is residual urine. After the operation we use diethylstilbesterol or estradiol. In this way bilateral orchectomy has been reserved for patients who have metastatic lesions or pain thought to be due to metastatic involvement.

COMMENT

The mortality rate for all patients who undergo transurethral prostatic resection ranges from 1 to 2 per cent. For elderly patients the mortality rate is higher, but it is not more than 2 or 3 per cent.

Complications occur most frequently among the elderly patients, who accordingly require more careful medical care.

Carcinoma of the prostate occurs more frequently as the age of the patient increases. At present the treatment of choice in cases of carcinoma of the prostate is transurethral resection and postoperative hormonal therapy. Bilateral orchectomy is reserved for a special group of patients.

PANCREATITIS IN GERIATRIC PRACTICE

Wingate M. Johnson, M. D., F. A. C. P. and O. T. Davis, M. D.

SINCE February 1943, when we first became interested in the subject of acute pancreatitis (1), we have collected a series of 35 cases of this disease. The clinical diagnosis was confirmed in all but one by the finding of an elevated serum or urinary amylase, by X-ray, by operation, or by a combination of two or more of these methods. Twenty-one of these cases have been seen by one of us, either at first hand or in consultation; the other 14 were seen by colleagues who gave us the privilege of abstracting the hospital records. Of these 35 patients, 21 were 45 years of age or older. These 21 cases, 60 per cent of the total number, form the basis of this paper.

GENERAL CONSIDERATIONS

Of the 21 patients past 45, 12 were females, 9 males. The average age was 57½. All the women were plump; four of the men were slender, three of average physique, and two obese. Nine of the women and five of the men had had previous gallbladder disease; three women had had cholecystectomies.

Only one of the patients had diabetes. In five nondiabetics tested the blood sugar during the attack was found to be within normal limits.

Although alcohol is considered to be a frequent predisposing or exciting factor in pancreatitis, none of these patients drank to excess, and most of them not at all.

According to the degree of damage done to the pancreas, acute pancreatitis may be classified as edematous, hemorrhagic, or suppurative. We believe that six of these cases were hemorrhagic, the remaining 15 edematous.

ETIOLOGY

The etiology of pancreatitis is far from clear. The factors most generally accepted as causes are: (1) regurgitation of bile, resulting from a stone in the ampulla of Vater, from edematous occlusion of the ampulla, or from spasm of the sphincter of Oddi; (2) infection; (3) vascular occlusion; (4) metaplasia of the ducts, causing obstruction; and (5) rupture of an overdistended ductule brought on by a heavy meal or by the ingestion of a large amount of alcohol.

Although it is now generally recognized that Opie (2) was mistaken in thinking that acute pancreatitis is always due to the regurgitation of bile into the pancreatic duct, its frequent association with gallbladder disease must be more than coincidental. In 12 of our cases it is probable that the associated cholecystitis had a causative relation. Nine of these patients had had repeated attacks of biliary colic prior to the recognition of their pancreatitis.

In at least four of our patients we believe the attacks were due to vascular

DR. WINGATE MEMORY JOHNSON and DR. O. T. DAVIS send their paper from the Department of Medicine, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina, where Dr. Johnson is Professor of Clinical Medicine and Chief of the Private Diagnostic Clinic and Dr. Davis was former Assistant Resident in Medicine.

occlusion. These were men, whose ages ranged from 67 to 88. All had well-marked arteriosclerotic changes. At least four of our other cases may have had a vascular basis. Kenneth Lynch (3) found that three of 18 cases seen by him at autopsy were due to vascular occlusion; he thinks that three more may have been due to small vessel obstruction. He noted that in two patients with malignant hypertension "there was extensive arteriolar sclerosis and arteriolar necrosis in the pancreas, and . . . extensive organizing thrombosis of arteries and veins." Dr. R. P. Morehead (4) has noted that in hypertensive individuals coming to autopsy the degree of arteriolar sclerosis in the pancreas is almost as great as that in the kidney.

TABLE 1

GENERAL CONSIDERATIONS

Age: 45 to 88; average 57.5

	No. Cases	Per Cent
Sex:		
Females	12	57
Males	9	43
Repeated attacks	10	48
Gallbladder disease	14	67
Obesity	9	43
Mortality	0	0

In one patient, who has had innumerable attacks over a period of six years, we believe that the most probable cause is a pancreatic calculus. One X-ray film showed a shadow which "might be a pancreatic calculus," but upon which our X-ray department will not stake its reputation.

Since the etiology of pancreatitis is still a matter of considerable doubt we will not hazard a guess at the causative factor in the remainder of our cases.

SYMPTOMS AND SIGNS

In all but one of our patients pain was the chief symptom. Moynihan (5) has described the pain of acute pancreatitis as the worst the human body can suffer, but one of our patients with a serum amylase of 458 units had a painless jaundice. In two other patients not even the worst attack could be characterized as agonizing. In the others, however, the onset of the attack was sudden and severe.

In all our patients the pain was located in the epigastrium. Most patients said they felt as if it were boring straight into the back; some stated that it radiated under one or both costal margins, oftenest the left; one described it as radiating into the chest, to the left shoulder, and down the left arm; others stated that it radiated into the lower part of the abdomen. In a few cases it did not radiate. It was described as steady rather than intermittent. Patients with severe attacks are very likely to lie flat on the back, often with both knees drawn up on the chest. They stated emphatically that any attempt to turn on either side made the pain worse. The epigastrium is exceedingly tender to pressure, and there is a variable degree of rigidity, although it is less marked than in ruptured peptic ulcer. Nausea and vomiting were present in 16 of our cases.

Fever was present at the beginning of the attack in only one of our cases.

TABLE 2
SYMPTOMS AND SIGNS

	No. Cases	Per Cent
Epigastric tenderness	21	100
Nausea and vomiting	16	76
Leukocytosis (16 cases)	10	62.5
Fever	14	67
Diarrhea	4	19
Mass	5	24
Shock	2	9.5

This patient had a pneumonitis of the left base, probably influenzal, at the time the attack began, and it is possible that her pancreatitis may have been due to infection. Thirteen other patients developed fever after operation or after the attack had persisted for several days. The pulse was not usually out of proportion to the temperature. Only two of our patients went into shock.

The leukocyte counts varied from 4900 to 29,000. As a rule the milder and afebrile cases did not have a leukocytosis. The differential counts were in line with the total counts.

In five cases a definite mass appeared in the epigastrium about the third day and persisted for several weeks, or until operation. This mass was quite tender and felt about the size of an orange. We believe all these cases were hemorrhagic. In all these patients the X-ray showed the presence of a mass in the region of the pancreas. In one case pleural effusion at the left base was noted. This patient later developed a bronchopneumonia of the left lower lobe.

COURSE AND DURATION

The duration of the symptoms in any one attack varied from a few hours to more than three months. At least 10 of our patients have had repeated attacks. There were no deaths.

In only one patient was operation performed to drain a hemorrhagic pancreatic cyst. Two patients had cholecystostomies; one had a cholecystectomy after the acute pancreatitis subsided. A fifth patient, a diabetic, who had had a cholecystectomy twenty years prior to her pancreatitis, began to have signs of pyloric obstruction months after a huge hemorrhagic pancreatic cyst had subsided. At operation the pylorus was found to be almost completely blocked by a band of adhesions. This band was freed, and the patient had complete relief for several months. The attacks of pain then recurred, but not the obstructive symptoms. We suspected a calculus, but the patient refused to consider another operation, and the attacks of pain ceased quite abruptly.

DIAGNOSIS

The diagnosis of acute pancreatitis is based upon the clinical picture plus the finding of an elevated serum or urinary amylase, and possibly X-ray evidence of an enlarged pancreas.

With the obstruction of the pancreatic ducts that takes place in acute pancreatitis, there is an overflow of the pancreatic juice into the lymphatics or capillaries and so into the circulation. While the concentration of all the pancreatic ferments in the blood will be increased, amylase is the one most quickly and easily demonstrated by laboratory methods.

The normal amylase content of the blood serum ranges from 80 to 150 Somogyi units per 100 cc. This means that 100 cc. of blood serum will normally produce 80 to 150 mg. of glucose from a stock starch solution. Values above 200 are definitely abnormal.

It should be remembered that the rise in serum amylase takes place very quickly—within a few hours—and that it can fall to normal or below with equal rapidity, sometimes in less than twenty-four hours. In one of our patients the serum amylase, although ordered immediately after her arrival in the hospital, was not done until noon the next day, more than twenty-four hours after the onset. By then it was slightly below the normal range. However, the clinical picture was so typical of acute pancreatic edema that the diagnosis was allowed to stand. Another patient had a serum amylase of 357 units within a few hours after the onset of a rather severe attack. Within less than twenty-four hours it had fallen to 90. The rapid fall may come about because the attack subsides very quickly, as in edematous pancreatitis, or because there is so much damage to the pancreas by the action of the liberated ferments that secretion is greatly lessened or stops entirely.

It is doubtful if there is another laboratory test nearly as specific and trustworthy as the serum amylase test if it is done early enough. Dr. Joseph H. Pratt (6) says: "In the recent literature I have read of no case in which the diastase test of the blood serum or urine was negative if the test was performed in the first twenty-four hours."

In our cases the serum amylase, if determined early in the attack, has ranged from 222 to 552 Somogyi units. Other observers have reported values as high as 1500 to 2000 units. The urine amylase in our patients has varied from 560 to 835 units, and apparently remains elevated about twenty-four hours longer than the serum amylase. For example, one patient had a severe epigastric pain about midnight. A specimen of urine the next morning contained 293 units of amylase. The next day the amylase content had risen to 835 units, and two days later had fallen to 65.

Although the urinary amylase is likely to remain elevated longer after an attack, the concentration of amylase in the serum is far more uniform than that in the urine. The wide variation in the specific gravity of the urine may account for the very inconstant ratio between the serum and urinary amylase content. Another consideration is that the urine rapidly loses its diastase activity if allowed to stand.

The leukocyte count was not particularly helpful in diagnosis. In the milder attacks it was usually normal or even low. In the more severe hemorrhagic forms of pancreatitis it is likely to be elevated.

The X-ray was helpful in at least four cases. In one patient the serum amylase was not determined until four days after the onset of the attack and was then within normal limits—82 units. By this time a mass could be palpated in the abdomen and the X-ray showed the widened duodenal loop characteristic of an enlarged pancreas.

The four conditions that are most likely to be confused with pancreatitis are (1) biliary colic, (2) ruptured peptic ulcer, (3) intestinal obstruction, and (4) coronary thrombosis.

1. Frequently pancreatitis is associated with or preceded by cholecystitis. Indeed, the history often obtained from a middle-aged patient who has had a series of attacks of upper abdominal pain preceding an unusually severe seizure of epigastric pain, with or without nausea and vomiting, could fit into either diagnosis. Of clinical importance is the observation that the patient lies quietly on his back, possibly with the thighs flexed on the abdomen, and objects strongly to turning on his side. If, in addition, he states that the pain is constant and bores straight through into his back, pancreatitis should certainly be considered and an amylase test done as soon as possible. Fortunately the immediate treatment of the two conditions is virtually the same.

2. The distinction between a ruptured ulcer and acute pancreatitis is of vital importance, since the first condition calls for immediate laparotomy, while the latter is usually treated conservatively. In both conditions the pain is sudden in onset, is located in the epigastrium, and is agonizing. In ruptured ulcer the rigidity comes on immediately and is more marked than that of pancreatitis; the abdomen is really boardlike.

If the patient is a female the chances are greatly against a ruptured ulcer. A previous history of ulcer is of course very important. The differential diagnosis, however, rests mainly upon the serum amylase determination, which can be done in about an hour. Bockus (7) says: "If the serum amylase is markedly elevated, a primary diagnosis of acute pancreatitis is justified since perforated peptic ulcer rarely increases the concentration of the pancreatic enzymes in the blood."

3. Intestinal obstruction should usually be diagnosed without much difficulty by the history of obstipation and recurrent colicky pain, and by the visible "pattern" made by the writhing coils of intestines. Usually there is a history of a preceding laparotomy. If the history, clinical picture, and X-ray findings do not make the diagnosis clear, a serum amylase determination may be necessary to rule out pancreatitis.

4. Coronary thrombosis is more likely to occur in the male, and is often preceded by anginal episodes. The pain is usually located in the chest, radiating down one or both arms or into the jaw; it is more rhythmic in character, and the patient does not show the marked tendency to lie motionless on the back. Later on there is a fall in blood pressure, with the development of fever, leukocytosis, and possibly a friction rub. The serum amylase determination is again the best means of differentiating the two conditions.

Gottesman, Casten, and Beller (8) have noted, in a small series of patients with acute pancreatitis, electrocardiographic changes which are similar to those occurring in coronary thrombosis and which have disappeared following recovery from the pancreatitis. In only three of our patients were electrocardiograms made during an attack of pancreatitis. These were reported as showing only low voltage; none gave the characteristic picture of coronary thrombosis.

We cannot agree with Gottesman *et al.* (8) when they speak of "the conservative or non-operative treatment of acute pancreatitis and the entirely dissimilar treatment of acute coronary disease." We had thought that bed rest and relief from pain by opiates were the chief weapons in the treatment of either condition.

In passing, it may be observed that some of the attacks of so-called "abdominal angina" noted in individuals with hypertension or arteriosclerosis may have been acute pancreatitis caused by vascular occlusion or spasm.

TREATMENT

Acute pancreatitis is no longer considered a surgical emergency, since most cases will subside spontaneously. In the majority of cases the only treatment necessary is relief of the pain. Elman (9) states that early in the attack a nitroglycerin tablet placed under the tongue and repeated if necessary will often give dramatic relief. We have not had his happy experience, and have had to resort to morphine or some other opiate. If this opiate is combined with hyoscine its effectiveness is usually increased. Morphine may be given intravenously if the pain is very severe.

In a severe attack the patient is likely to be nauseated and cannot retain food or fluids by mouth. Furthermore, oral nourishment would stimulate pancreatic secretion and increase the pain. For this reason food is withheld during the acute stage. The fluid balance can be maintained by glucose or saline intravenously, repeated as often as necessary.

Most cases of acute pancreatitis are due to pancreatic edema, and subside promptly. Even patients with hemorrhagic pancreatitis will often recover if treated conservatively. If true suppurative or necrotic pancreatitis develops operation may become necessary; but such cases are comparatively rare.

Elman (9) recommends an X-ray study of the patient's gastrointestinal tract and gallbladder after the acute attack has subsided. If a diseased gallbladder is found, he recommends its removal. It seems to us, however, that cholecystostomy may offer more adequate decompression of the pancreas. The fact that three of our patients had their gallbladders removed some years before they developed pancreatitis shows that cholecystectomy is not a certain prophylactic. For patients who have had cholecystitis without stones, appropriate management of this disease may help prevent attacks of pancreatitis.

For older patients who have had repeated attacks of pancreatitis, probably on a vascular basis, it seems logical to give nitroglycerin for the attacks and to employ the same general regimen that one would use in a patient with angina pectoris.

SUMMARY AND CONCLUSIONS

1. Pancreatitis is far more common than is generally thought, and occurs more frequently after middle age.

2. Pancreatitis can often be suspected clinically and can be diagnosed almost invariably by the serum amylase test properly performed.

3. The etiology of pancreatitis is still questionable. It is probable that the disease may be caused by any one of a number of factors.

4. The fact that pancreatitis is far more often a medical than a surgical condition makes its recognition exceedingly important.

REFERENCES

1. Johnson, Wingate M. and Davis, O. T.: Pancreatitis: An Analysis of Twenty-two Cases. South. Med. J. 38:373-79 (June) 1945.
2. Opie, E. L.: The Etiology of Acute Pancreatitis. Bull. Johns Hopkins Hosp. 12:182, 1901.

3. LYNCH, K. M.: Pancreatitis: An Analysis of Types and Causes. Ann. Int. Med. 14:628-40 (Oct.) 1940.
4. MOREHEAD, R. P.: Personal communication.
5. MOYNIHAN, B.: Acute Pancreatitis. Ann. Surg. 81:132-42 (Jan.) 1925.
6. PRATT, JOSEPH H.: Diagnosis of Pancreatic Disease. New York State J. Med., 43:1847-55 (Oct. 1) 1943.
7. BOCKUS, HENRY L.: Gastro-Enterology. Philadelphia: W. B. Saunders, 1943, vol. 1, p. 509.
8. GOTTESMAN, J., CASTEN, D., and BELLER, A. J.: Changes in Electrocardiogram Induced by Acute Pancreatitis. J. A. M. A. 123:892-94 (Dec. 6) 1943.
9. ELMAN, ROBERT: Surgical Aspects of Acute Pancreatitis. J. A. M. A. 118:1265-68 (April 11) 1942.

The technical assistance of Miss Eleanor Stafford, B.S., of the staff in clinical chemistry, is gratefully acknowledged.

OLD AGE COULD BE POSTPONED BY APPLICATION OF PRESENT KNOWLEDGE

IF MEDICAL science could secure public co-operation in applying what is now known, old age could be postponed for five to ten years for a large part of the population, according to Dr. William J. Kerr of the University of California Medical School.

Dr. Kerr recommended the following program for lengthening the life span, especially of persons incapacitated by some types of heart disease, hardening of the arteries, obesity, postural defects, and pulmonary emphysema: (1) Correction of postural defects; (2) a physical fitness program; (3) application of present dietary knowledge. These steps, Dr. Kerr said, would maintain the circulatory system in good condition for a longer period and cut down the weight, which causes an overload on the heart; nearly all the destruction of postural distortion and obesity would be eliminated.

While it is encouraging to look forward to the time when research may provide answers to the problem of what causes heart disease, high blood pressure, and other clinical states associated with the degenerative diseases, much can and should be done now on the basis of present knowledge.—SCIENCE SERVICE.

GUILLAIN-BARRÉ'S DISEASE IN THE OLDER AGE GROUP

A. B. Baker, M. D.

WITHIN recent years a considerable literature has accumulated on the subject of Guillain-Barré's disease. Many of the articles have given particular emphasis to the disease in children; none have considered its implications when involving the older age group. Since the entire course and prognosis of the disease are altered when it appears in elderly individuals, a review with emphasis upon our experience in the older age group may be of definite value.

The symptom complex commonly referred to as Guillain-Barré's syndrome has been recognized since 1892, when Osler (12) first described it under the term "acute febrile polyneuritis." Since that time cases apparently belonging to this same group have been described under a wide variety of terms: "radiculoneuritis" (Guillain, Barré, and Strohl, 9; Guillain, 10); "acute ascending paralysis" (Casamajor, 4); "acute infective polyneuritis" (Bradford, Bashford, and Wilson, 3); "infective neuronitis" (Kennedy, 11); "polyneuritis with facial diplegia" (Francois, Zuccoli, and Montus, 6, and Taylor and McDonald, 20); "myeloradiculitis" (Strauss and Rabiner, 19); "neuronitis" (Gilpin, Moersch, and Kernohan, 7); "myeloradiculoneuritis" (Shaskan, Teitelbaum, and Stevenson, 18); and "encephalo-myelo-radiculitis" (Polan and Baker, 14).

Since this disease seems capable of involving almost any part of the nervous system, the resulting clinical symptoms and signs are naturally most variable. Hence the differentiation of this illness from variants of already well-known neurological disorders is often very difficult. At present it is impossible to determine definitely whether the numerous cases reported in the literature actually belong to the same symptom complex or are the result of totally unrelated disease processes. However, most of the cases reported do have in common so many features that definitely differ from the characteristics observed in other neurological disorders that one is unable to avoid the conviction that they represent a specific disease entity, probably of virus origin. Such an impression is strengthened when one considers the histopathological alterations observed in fatal cases—changes that in many respects resemble lesions observed in both proved and suspected virus infections.

Since Guillain and Barré were the investigators who described the distinctive features of the disease, it would seem best to refer to it as "Guillain-Barré's disease" in order to avoid the confusion of conflicting terminology, at any rate until some specific etiological agent is isolated.

Guillain, Barré, and Strohl (9) and Guillain (10) first reported on this illness in 1916, and again in 1936, recording a total of 12 cases. Their patients all

DR. A. B. BAKER, Associate Professor of Neurology, University of Minnesota Medical School, is a member of the American Neurological Association, the Central Neuropsychiatric Association, the Society of Experimental Pathology, and the American Association of Neuropathology; a Diplomate of the American Board of Neurology and Psychiatry; and a Fellow of the American Medical Association.

developed a flaccid paralysis of the limbs with some involvement of both deep and superficial sensation. In all their cases the spinal fluid contained an elevated protein without pleocytosis; and it was the cell-protein dissociation that these authors considered specific for this illness. No atttempt will be made to review the literature completely, since such reviews have already been published (Gilpin, Moersch, Kernohan, 7; Polan and Baker, 14; Baker, 2). Most of the more recent publications have consisted of descriptions of isolated cases (Saurer, 17; Glen, 8; Anderson, 1; Santi, 16; Casamajor and Alpers, 5).

CHARACTERIZING FEATURES OF GUILLAIN-BARRÉ'S DISEASE

To describe adequately the criteria used in the diagnosis of this disease it is necessary to discuss briefly the features that characterize this illness. It is only after one has a clear picture of the entire morbid process, including its differentiating characteristics and clinical course, that one is able to identify the disease from among the many similar diseases encountered in the neurological field. These special features are:

1. *A rather sudden onset, occasionally preceded by a history of some antecedent infection, chiefly of the respiratory passages.* In the majority of cases mild premonitory symptoms, suggestive of some antecedent infection of the upper respiratory tracts, appear a few days or even a number of weeks prior to the acute illness. These preliminary symptoms may vary from such mild complaints as malaise, fleeting pains, muscle tenderness, backache, and mild lethargy to such acute disturbances as nausea, vomiting, severe persistent headaches, chills, severe muscular aching, anorexia, and soreness in the neck. In an occasional case there may be a prolonged period of headaches, often very severe, and some soreness in the neck. The acute illness is usually fairly sudden in onset and may follow directly after the vague premonitory complaints or may appear only after a latent period of well-being, lasting many days or even weeks.

2. *Absence of findings suggestive of a septic or toxic reaction in spite of the severe clinical symptomatology.* The patients as a rule show almost no hyperpyrexia, unless there is some complicating infection in the urinary or respiratory tracts. The pulse also is unchanged and continues to be full and regular. The blood picture is generally unaltered, but at times the leukocytes may be slightly elevated, and counts as high as 15,000 cells per cubic millimeter have been recorded. Usually the leukocytes range between 7000 and 9000 and show a normal differential count. Even the sedimentation rate remains within normal limits, although on occasion these rates have been somewhat elevated. Whenever the laboratory findings indicate definite variations from normal one must check carefully for some complicating infection, since in our experience this disease in itself will not excite any of the changes associated with the more common bacterial or toxic reactions.

3. *A cell-protein dissociation in the spinal fluid with a normal cell count and a high protein.* This finding has been advocated as one of the most characteristic features of the disease. Guillain, Barré, and Strohl (9) first pointed out this observation and have since gone so far as to insist that the presence of 1 to 2 grams of protein in the spinal fluid is necessary before one is justified in diagnosing this disease. Many investigators, however, are of the opinion that too much

emphasis has been placed upon this cell-protein dissociation, which alone is neither pathognomonic nor absolutely necessary for a diagnosis of this disease. It has been generally accepted that the degree of protein in the spinal fluid varies with the stage of the illness, and the presence of an elevated protein will naturally depend a great deal on how frequently the spinal fluid is examined. In many of of our cases we have observed a normal fluid at the onset of the illness, only to have the protein become elevated later in the course of the disease.

Investigators have also taken issue with Guillain's firm stand against a pleocytosis. The presence of a mild or moderate cell increase, chiefly mononuclears, is not incompatible with a diagnosis of this disease. In their cases Gilpin, Moersch, and Kernohan (7) reported a cell variation from 1 to 80. Similar cellular elevations have been reported by Taylor and McDonald (20) and Polan and Baker (14). In our cases the spinal fluid cell count has ranged from 0 to 154 cells, chiefly mononuclears.

4. *Radicular involvement.* This involvement is one of the most constant features of the disease, regardless of the region of the nervous system predominantly involved at the height of the illness. The radicular pain is early in onset and, though it involves primarily the extremities, may appear in any region of the body. The pain may be widespread and comprise an outstanding part of the entire clinical picture, or it may become well localized to small regions of the body and eventually be overshadowed by the subsequent symptoms referable to involvement of the peripheral nerves, cord, or cerebrum.

5. *Facial nerve palsy.* So frequent has been the involvement of the facial nerve that some of the original descriptions of this syndrome were reported as a "facial diplegia associated with a polyneuritis" (Patrick, 13). The frequent palsy of the facial musculature has been well recognized, but the emphasis placed upon this finding has varied greatly in different publications. Generally one can say that the presence of a facial weakness is a helpful and extremely suggestive indication of this syndrome, but by no means necessary for a diagnosis.

6. *Absence of mental symptoms even in the presence of a very severe illness; marked irritability.* Very few investigators have reported mental symptoms in this disease. Occasionally, however, in the more severely involved cases, mild delirium with disorientation, restlessness, and excitement may occur. Somnolence and mild lethargy are by no means uncommon and are usually observed early in such patients.

During the early phases of the illness many patients show a marked irritability and explosiveness, and are difficult to please or satisfy. It is often amazing how they change to complacent, friendly, and composed individuals during convalescence.

7. *Favorable prognosis, usually with fairly good functional recovery.* Guillain (10) has emphasized this feature as one of the essential characteristics of the disease. It is his opinion that the disease is always benign, and that, should the condition terminate unfavorably, the diagnosis has been incorrect. Most investigators, however, have not accepted this dogmatic point of view. It is becoming more and more apparent that the outcome is not always favorable and that cases can terminate fatally or recover with resultant residuals. Many of our patients, in spite of a satisfactory recovery after a stormy illness, have developed residuals that have persisted for many years. Generally one can say that recovery

is the rule in this illness, regardless of the severity of the clinical picture, but that in many of the more severe cases, and particularly in the older patients, residuals or even fatalities will eventuate.

From a review of these features of the disease it is readily apparent that no single characteristic can be designated as diagnostic. In view of the absence of any specific etiological agent one is forced to accept a more practical attitude in regard to this illness and to consider in the diagnosis all the features presented. It is only after a careful consideration of all the symptoms and signs that one arrives at a final satisfactory diagnosis. This procedure will often necessitate a fairly prolonged period of observation before one feels justified in classifying the illness and venturing a prognosis.

CLINICAL FORMS

Many descriptions of the clinical features have appeared in the literature. One finds, however, that generally the symptomatology has been oversimplified. The neurological complaints and findings may be most variable and will naturally depend upon the part or parts of the nervous system involved. Usually the involvement tends to be accentuated within certain regions, thus producing a predominating symptomatology, but modified by less striking and often scattered complaints from other impaired parts of the nervous system.

For convenience, therefore, one might classify the clinical pictures seen in this condition into five forms, depending upon the region most severely involved; namely, the abortive or mononeuritic, the polyneuritic, the myelitic, the bulbar, and the cerebral types of illness. Although these forms of the disease seem to differ greatly clinically, they present certain related features. Probably the most outstanding are the radicular pain, the acute muscle tenderness, and the marked clinical improvement in spite of apparently severe damage to the nervous system. The radicular pain may involve any part of the body, but most commonly occurs in the proximal parts of the limbs.

These spontaneous pains may be mild or violent, and are often provoked by pressure on the muscles or by movement of the limbs. They persist for weeks and require heavy medication for relief of the extreme discomfort. Severe muscle tenderness almost always accompanies the radicular pain, but it may occur independently and persist for a longer period of time.

Certain other features, already discussed, also appear fairly consistently in all forms, and are helpful diagnostically. The course of the disease is usually afebrile, with little or no alteration in the leukocyte count. Sometime during the course of the illness the spinal fluid will probably show an elevated protein, with a relatively normal cell count.

Aside from these general features, the clinical symptomatology differs radically from case to case, as will be demonstrated by the illustrative material.

TYPE I. *Abortive or Mononeuritic Form.* There can be no doubt that slight attacks of this illness do occur and pass unrecognized, and thus the frequency of the disease is probably much greater than is generally recognized. In our experience it is this form that has been most underemphasized, probably because the rigid criteria set up by Guillain have been too closely adhered to. During the period when we were seeing most of our cases we studied many patients who presented complaints identical with those observed in the early stages of Guillain-

Barré's syndrome. These individuals gave a history of sudden onset of severe radicular pain, often preceded by some antecedent infection of the upper respiratory passages. The radicular pain was at first fleeting in character, involving the limbs or the trunk, and was often associated with some muscular aching and severe headache. This pain would not uncommonly disappear within a few days, only to return after a latent period of several weeks; occasionally it did not disappear but became localized to a single limb, where it was soon followed by muscular weakness or paralysis, distal hyperesthesias, and very painful aching muscles. In spite of the predominantly mononeuritic symptomatology, careful neurological examination almost always revealed other scattered findings indicative of the more diffuse nature of the actual involvement.

Usually in the abortive form the illness begins to recede after about two weeks, with complete recovery in about a month. In an occasional severe case the weakness may persist for many months and be accompanied by a mild but definite muscular atrophy. Even in the older age group this form of Guillain-Barré's disease appears to carry with it a favorable prognosis.

CASE 7. P. H. (H. N. 627350), a 62-year-old farmer, while plowing suddenly developed a severe, momentary sharp pain in the upper medial aspect of the right thigh, followed within a few hours by some soreness and stiffness in the same extremity. That evening he developed tenseness in the adductor muscles. The pain became progressively worse, was not relieved by medicinal treatment, and prevented him from sleeping. Because of the persistence of this pain he was hospitalized after a few days for further treatment.

Examination revealed the patient's pupils to be slightly irregular. The middle and lower abdominal reflexes were absent, as was also the right knee jerk. There was considerable limitation in the movement of the right leg, owing to pain, and the muscles in this limb were very sensitive to pressure. There was an area of hyperesthesia over the medial aspect of the right thigh. Laboratory studies revealed a blood count of 7500, with 65 per cent polymorphonuclears and 35 per cent mononuclears. A spinal puncture showed no cells and 75 mg. per cent of protein.

The patient remained in the hospital for three weeks, during which time he gradually improved. Ten days after admission he developed hiccoughs, which continued for one week with only short intervals of relief. During this same period he became mildly confused and disoriented. Following recovery from the hiccoughs the confusion also cleared up, but the patient continued to be somewhat irritable and suspicious.

The pain in his thigh gradually decreased, and at the time of his discharge he appeared to be completely recovered. The entire course of his illness was afebrile.

TYPE II. *Polyneuritic Form.* This form of the illness is the one most frequently described, although many cases listed as polyneuritic actually show extensive signs of cord involvement. After a few premonitory signs suggestive of the abortive form of the illness or after a latent interval following an upper respiratory infection, these patients usually develop either a gradual or often a sudden onset of motor weakness, involving the limbs, primarily the lower extremities. This motor weakness is flaccid in type and at its onset almost always involves the entire extremity.

Individual muscles are almost never affected; there appears to be a definite tendency to involve the larger muscle groups of the proximal regions of the

limbs, namely, the thighs, the pelvis, and the shoulder girdle. Weakness in the upper extremities usually occurs later than the involvement of the lower limbs and is often less severe. Not uncommonly the muscles of the trunk and of the anterior abdominal wall are also involved, and the patient has difficulty in rising or sitting up in bed. Only exceptionally does the distal musculature become weakened early in the disease, and even in these cases the palsy soon spreads to the entire extremity, with the most severe disabilities occurring in the shoulder and hip regions.

Paresthesias, hyperesthesias, and anesthesias with severe muscular pain may precede or accompany the motor weakness. In some cases the sensory involvement may be much more extensive and severe than the motor impairment and may comprise the predominant part of the clinical picture. Occasionally, when the sensory involvement is severe, it not uncommonly follows a glove-stocking distribution. In such cases the paresthesias may persist throughout the entire course of the illness, and may create a serious treatment problem. Headaches of an intense type occur and may continue throughout the early part of the disease.

This type of illness has been extremely uncommon in the older age group, and when it does occur seems to offer a favorable prognosis.

CASE 5. A. E. (H. N. 703781), a 60-year-old farmer, first became ill three weeks after an attack of pneumonia, at which time he developed a severe pain in his left arm and shoulder. This pain remained localized for one day and then spread to the other arm and later to both lower limbs. The pain at onset was periodic, but after a few days became constant and was associated with extreme muscle tenderness. Shortly before admission his limbs had become very weak, so that walking was difficult and feeding himself was almost impossible.

On admission, three months following the onset of his illness, there was a marked paresis and atrophy of the muscles of the shoulder girdle and arm bilaterally. There was a slight tremor of the hands. The lower limbs were less severely involved. The calf muscles were extremely painful to pressure. Sensation was objectively normal, with the exception of a marked hyperesthesia over the soles of the feet. Laboratory studies were all within normal limits. The spinal fluid contained no cells and 48 mg. per cent of protein.

The patient was placed on strict bed rest and given physical therapy. After one week his pain disappeared and the muscle tenderness became reduced. At the time of discharge his muscle strength had begun to return and the patient was already able to feed himself.

TYPE III. *Myelitic Form.* In our experience this form of the illness appears to be the most frequent, comprising almost half of our cases. The progress of the illness is dramatic, and a severely involved individual may make a fairly rapid and almost spectacular recovery in a very short time. More often than in any other form, the onset may be sudden and the course rapid, with no premonitory symptoms.

These patients complain of a slight numbness and tingling in the lower limbs, followed within a few hours by a marked paresis that may develop into a complete paralysis within a very short time. The motor involvement is usually of a flaccid type, although in some cases it may be partially spastic, indicating involvement of the upper motor neuron. The deep reflexes are usually reduced or absent, but may be hyperactive, associated with sustained or unsustained clonus.

Early in the disease there is definite muscle tenderness, which, as it dis-

appears, reveals a loss of muscle and tendon pain. If the illness is very severe a similar involvement of the upper extremities may develop. Sensory disturbances, primarily of the superficial type, comprise a prominent part of the clinical picture and are of a definite segmental nature, ascending with the progression of the disease and producing a definite sensory level, as is so often seen in a transverse myelitis. Bowel and bladder dysfunction occur relatively early, resulting in urinary retention and bowel incontinence or constipation. Aside from the typical cord involvement, these patients also develop severe radicular pain and scattered cranial nerve palsies.

The spinal fluid protein becomes elevated early, thus facilitating the diagnosis. The spinal fluid cell count at first may also be elevated, but soon returns to normal.

The course is very impressive. In younger individuals, after a continued progression for two to four weeks, the illness suddenly begins to recede and the rapid recovery can be followed clinically by checking the level of the sensory disturbance, which diminishes daily and is associated with a concomitant improvement in the muscular palsies. The paresthesias disappear as soon as improvement begins.

Recovery is usually complete, although some residuals remain in the form of a persistent paresis of scattered muscle groups. In the older age group this form of the illness is almost invariably associated with severe bulbar involvement, and the prognosis is extremely grave. Only two of our patients past 50 years of age recovered from this form of the illness, and in only one was the cord involvement uncomplicated by bulbar disturbances.

CASE 1. F. K. (H. N. 744746), a 51-year-old male, was in excellent health until two weeks before admission to the hospital, when he became ill with malaise and fever lasting 24 hours. He was up and working the following day, although still complaining of malaise and anorexia. One week later he was awakened at night with severe aching pain in the upper extremities. This pain soon spread to involve the lower limbs. The pain was severe and continuous. Four days later he noted gradually increasing weakness of his legs, although he was still able to walk. The paresis progressed upward during the next few days, involving both arms. By the third day he began to have difficulty in swallowing and some urinary incontinence. At the time of admission he was unable to use his limbs.

Neurological examination revealed a severe flaccid paralysis of all four limbs. Weak flexion and extension were possible at all joints; paresis was more marked on the right. No reflexes were elicited, with the exception of a weak biceps reflex bilaterally. Both deep and superficial sensation was markedly impaired. Superficial sensation was absent in the legs and reduced to the level of the nipple line. Deep sensation seemed more involved than superficial sensation. The patient had difficulty in swallowing and breathing. The sternocleidomastoid muscle was paretic on the left, and the tongue was weak bilaterally.

Laboratory studies were negative, except for the spinal fluid, which contained no cells and a protein content of 72 mg. per cent.

The patient's initial dehydration was treated. Treatment otherwise was symptomatic, including massive vitamin therapy. The patient developed an aspiration pneumonia, which resolved under sulfanilamide therapy. Prognosis was initially grave because of the bulbar involvement, but the patient slowly recovered over a period of four months. At the time of discharge strength was good in both legs and the right arm, but the left arm remained partially paralyzed and the deep reflexes were still absent.

TYPE IV. *Bulbar Form.* This type of the illness is almost invariably accompanied by involvement of other parts of the nervous system, though the bulbar symptoms comprise the most impressive part of the clinical syndrome. In most cases the bulbar symptoms occur only after the illness has been in progress for some time, although in an occasional case the cranial nerve damage appears suddenly and early and overshadows all other findings.

Almost any of the cranial nerves may be involved, with resulting ophthalmoplegias, diplopia, anisocoria, facial anesthesia or hypesthesias, vertigo, dysarthria, dysphagia, and dysphonias. Unilateral or bilateral facial palsies are extremely frequent and often very severe. In an occasional case the medullary damage may be so severe that even respiratory and cardiac irregularities occur. Aside from the facial palsies, the most common bulbar symptoms consist of disturbances in articulation and deglutition. Speech becomes nasal in type, and fluids are regurgitated through the nose.

In younger individuals the prognosis is usually good, in spite of the apparently severe involvement in such a vital region. In the older age group this type of involvement carries with it a most grave prognosis, and only occasionally does the patient recover from the illness. In the cases reported in this paper five showed bulbar symptoms, and only one recovered.

CASE 6. H. B. (N 1827), a 60-year-old male, was admitted to the hospital on May 7, 1943. For the past ten days he had noticed progressive hypesthesia of the upper extremities, spreading to the lower limbs. A few days before admission he developed weakness in all limbs and extreme restlessness.

Examination on admission showed a flaccid quadriplegia, with absence of all deep reflexes. There was a bilateral weakness of the 9th, 10th, and 12th cranial nerves. The patient had difficulty in talking, breathing, and swallowing. He remained in the hospital five days. The bulbar paralysis became more and more marked, and he expired of respiratory difficulty. The spinal fluid contained four cells and a protein of 126 mg. per cent.

Autopsy studies of the brain revealed mild neurocellular alterations. There were a few irregular areas of partial staining loss and perivascular foci of demyelinization. There were irregular zones of myelin degeneration in the posterior and lateral columns of the cord. The rootlets and peripheral nerves showed mild regressive changes.

TYPE V. *Cerebral Form.* This form is an extremely rare and not usually recognized type of Guillain-Barré's disease. It usually begins with severe headaches, malaise, vertigo, and nausea. The patients feel weak and remain in bed for a few days. The symptoms may then subside, only to be followed by mild facial weakness or scattered radicular pains. After a few days the headaches again return and are often accompanied by a mild lethargy, which tends to increase in severity. As the illness progresses signs of cord or bulbar involvement may develop. Some patients become confused, noisy, restless, and agitated. It is in this form of the illness that papilledema usually appears. The prognosis must be guarded, although many patients make a fairly complete recovery.

A summary of our cases is given in Table 1. Since there were only ten cases in individuals past 50 years of age, conclusions must be drawn with caution. The majority of cases tended to occur during the colder weather, particularly during the winter months. In none of these cases, in spite of careful questioning, was there any suggestion of a similar illness in other members of the same family or community.

In spite of the general impression that this disease appears chiefly as a polyneuritis (Patrick, 13; Taylor and McDonald, 20; Bradford, Bashford, and

Wilson, 3), the most common clinical picture, at least in the older age group, was referable to involvement of the spinal cord and bulb (Groups III and IV in Table 1). Six of the ten patients manifested such an involvement.

The spinal fluid in almost every case revealed a cell-protein dissociation. In only one case was the protein level within normal limits. One patient had over 8000 mg. per cent of protein.

COURSE AND PROGNOSIS

Guillain (9, 10) in his publications insisted that the outcome of this disease was always favorable, and that all cases recovered fairly promptly and completely after an illness of a few weeks or months. He felt that the real syndrome was always benign. It is apparent from a review of the literature, as well as from a study of our own cases, that this point of view is too extreme. It is true that, in spite of a fairly severe clinical involvement, these patients usually show a gradual and continuous improvement over a period of many months or years, with fairly complete recovery. However, the more cases one studies and the longer one follows the recovered patients, the more cautious one becomes regarding the ultimate prognosis.

In a previous publication we reported on 33 cases of Guillain-Barré's disease occurring in all age groups. In this series only three resulted in death, with a mortality rate of 9 per cent. In the present study, in which only the older age group was considered, four out of ten patients died, a 40 per cent mortality rate. It is apparent even from this small series that the disease is much more serious when it occurs in older individuals and that the prognosis must remain extremely grave when the central nervous system is involved.

TREATMENT

The treatment at present is entirely symptomatic. The following measures have proved beneficial in our experience.

1. Strict bed rest during the acute stage of the illness. This is a most important therapeutic measure. In patients who have refused to accept complete bed rest and have continued to be up and around during the early stages of the illness the involvement has invariably continued to progress and has often become most severe. Immediate hospitalization not uncommonly results in a much more rapid arrest of the disease process, with subsequent improvements in both the sensory and motor impairment.

2. Medication, and particularly heat, to combat the severe discomforts of the radicular pain and muscle tenderness. The treatment of the painful limbs often constitutes one of the most trying therapeutic problems in this disease, especially since these pains may persist throughout the course of the illness. One hesitates to resort to the opiates, but we have found that codeine in small doses often offers by far the most satisfactory results. The barbiturates, especially sodium phenobarbital intramuscularly, have been found helpful, but not entirely satisfactory when used alone. In children, chloral hydrate by rectum frequently offers satisfactory sedation. Hot wet packs, completely surrounding the painful extremities and applied every alternate hour, produce great comfort to the patient and are very useful in relieving some of the more intractable pain.

3. Large doses of vitamins B_1 and C, especially in cases that appear to have a radiculitis or a polyneuritis. It has been our practice to give our patients 150 mg. each of thiamine chloride and cevitamic acid daily during the first week of the illness; thereafter, the dosage is reduced to 9 mg. of vitamin B_1 and 75 mg. of vitamin C. It has been our impression that the best results are obtained when

these two vitamins are used together, and we have therefore had them combined in a single tablet to facilitate use.

4. Tidal bladder irrigation and the sulfonamide group of drugs to combat urinary involvement and infection in cases with sphincter disturbances.

5. Multiple small transfusions in the acutely ill patient.

6. Maintenance of adequate nourishment in the acutely ill patient. Not infrequently when the illness is severe an inadequate intake of food results, either because of the patient's unwillingness to eat or because of a bulbar palsy with dysphagia. The tendency may become quite alarming, since these patients frequently go into a negative nitrogen balance and remove the necessary proteins from the various body organs, particularly the liver, which may already be involved by the disease process (15). In order to prevent such an occurrence one should not delay in instituting tube-feeding, preferably by means of a slow, continuous drip method.

The formula used should contain an excess of protein, at least 4 gm. per kilo body weight for the adult, in order to maintain a positive nitrogen balance. One can easily supplement such a feeding by an adequate quantity of the necessary vitamins. Through the use of such continuous drip feeding one avoids overloading the stomach, and vomiting is frequently prevented. For our feeding formula we have adopted the Varco diet (21), supplemented by Dietene* and Brewer's yeast to furnish an adequate vitamin intake. A sample of this feeding formula is given in Table 2.

TABLE 2
DAILY FEEDING FOR AN ADULT

Varco Diet Containing 2420 Calories		
Milk	1000	cc.
Eggs	6	
Egg whites	2	
Skimmed milk powder	1	cup
Dextrose	1.5	cups
Salt	5	gm.
Supplemented by Dietene and Brewer's Yeast Containing 1106 Calories		
Milk	100	cc.
Dietene	60	gm.
Brewer's yeast	60	gm.

7. Physiotherapy for the muscular involvement as recovery begins. Throughout the course of the illness mild muscle massage and even passive motion should be instituted. It can be increased as recovery continues and the limb tenderness decreases. Some form of physical therapy may be necessary for long periods after the patient has left the hospital.

SUMMARY AND CONCLUSIONS

1. Ten cases of Guillain-Barré's disease occurring in individuals over 50 years of age are reported.

2. Since this disease may involve any part of the peripheral or central nervous system, we have divided the resulting clinical syndromes into five

*Dietene, manufactured by the Dietene Company, Minneapolis, can be mixed with milk and readily passes through a nasal tube. One hundred grams are equivalent to 338 calories and contain: protein, 18 gm.; fat, 4.4 gm.; carbohydrate, 69 gm.; calcium, .60 gm.; phosphorus, .55 gm.; Fe, .15 gm.; vitamin A, 10,000 units; vitamin B_1, 2.5 mg.; vitamin C, 75 mg.; vitamin D, 1000 units: riboflavin, 3.3 mg.; nicotinic acid, 2.2 mg.

TABLE 1
CLINICAL FEATURES OF GUILLAIN-BARRÉ'S DISEASE

Case No.	Name and Hospital No.	Sex	Age	Date of Onset	Type of Illness*	Bulbar Symptoms	Spinal Fluid		Temperature	Duration of Illness	Leukocyte	Outcome
							Protein	Cells				
1	F. K. 744746	M	51	June 1944	III IV	+	72	0	99	12 mo.	6,300	Paresis upper limbs
2	T. S. 726426	M	57	Dec. 1942	I	—	76	0	97–98.6	12 mo.	10,650	Paresis left leg
3	J. C. 72617	M	57	Dec. 1941	III	—	151	5	98.6	12 mo.	5,700	Paresis right leg
4	H. P. 733003	M	58	May 1943	III IV	+	..	..	102	2 mo.	7,750	Death
5	A. E. 703781	M	60	March 1945	II	—	48	0	98.6	3+ mo.	8,800	Paresis upper limbs
6	H. B. N 1827	M	60	March 1943	III IV	+	126	4	.....	2 mo.	5,300	Death
7	P. H. 627353	M	62	May 1940	I	+	75	0	98.6	4 mo.	7,500	Complete recovery
8	C. P. 749577	F	62	Oct. 1944	III IV	+	..	..	98.6	3 weeks	9,300	Death
9	F. S. N 1817	M	70	Jan. 1943	III IV	+	8015	2	.....	1.5 mo.	10,000	Death
10	L. H. 743621	M	70	Jan. 1944	I	—	54	1	98.6	6 mo.	6,800	Paresis right leg

*I. Abortive or mononeuritic; II. polyneuritic; III. myelitic; IV. bulbar; V. cerebral.

forms, depending upon the region of the nervous system most severely involved. These consist of (1) the abortive or mononeuritic, (2) the polyneuritic, (3) the myelitic, (4) the bulbar, and (5) the cerebral types of Guillain-Barré's disease.

3. Certain features, when associated with any of the above clinical forms of this disease, aid greatly in the diagnosis. These consist of marked radicular pain and muscle tenderness, a normal or only slightly elevated temperature and leukocyte count, a cell-protein dissociation in the spinal fluid, a facial palsy, and a favorable prognosis in spite of an apparently severe illness.

4. In the older patient this disease tends to be much more severe, frequently involving the cord and the bulbar regions.

5. In spite of the apparent favorable outlook in this disease, in patients over 50 years of age the prognosis is generally very grave and the fatality rate is as high as 40 per cent.

REFERENCES

1. Anderson, G. C.: Polyradiculoneuritis, the Guillain-Barrè Syndrome: A Case Report. New Orleans Med. & Surg. J., 93:443, 1940-41.
2. Baker, A. B.: Guillain-Barré's Disease (Encephalo-Myelo-Radiculitis): A Review of 33 Cases. J. Lancet, 63:384, 1943.
3. Bradford, J. R., Bashford, E. F., and Wilson, J. A.: Acute Infective Polyneuritis. Quart. J. Med., 12:88, 1918.
4. Casamajor, L.: Acute Ascending Paralysis among Troops. Arch. Neurol. & Psychiat., 2:705, 1919.
5. Casamajor, L., and Alpers, G. R.: Guillain-Barrè Syndrome in Children: A Review of the Literature and Report of Three Additional Cases. Am. J. Dis. Child., 61:99, 1941.
6. Francois, M., Zuccoli, G., and Montus, G.: Sur un cas polyradiculonévrite curable avec dissociation albumino-cytologique: Syndrome de Guillain et de Barré. Rev. Neurol., 36:95, 1929.
7. Gilpin, S. F., Moersch, F. P., and Kernohan, J. W.: Polyneuritis: A Clinical and Pathological Study of a Special Group of Cases Frequently Referred to as Instances of Neuronitis. Arch. Neurol. & Psychiat., 35:937, 1936.
8. Glen, A.: A Case of Polyradiculoneuritis. Brit. Med. J., 2:11, 1942.
9. Guillain, G., Barré, J., and Strohl, A.: Sur un syndrome de radiculonévrite avec hyperalbuminose du liquide cephalorachidien sans reaction cellulaire: Remarques sur les caractères cliniques et graphiques des reflexes tendineux. Bull. et mém. Soc. méd. d. hop. de Paris, 40:1462, 1916.
10. Guillain, G.: Radiculoneuritis with Acellular Hyperalbuminosis of the Cerebrospinal Fluid. Arch. Neurol. & Psychiat., 36:975, 1936.
11. Kennedy, F.: Infective Neuronitis. Arch. Neurol. & Psychiat., 2:621, 1919.
12. Osler, W.: Principles and Practice of Medicine. New York: D. Appleton & Co., 1892.
13. Patrick, H. T.: Facial Diplegia in Multiple Neuritis. J. Nerv. & Ment. Dis., 44:322, 1916.
14. Polan, C. G., and Baker, A. B.: Encephalo-Myelo-Radiculitis. J. Nerv. & Ment. Dis., 96:508, 1942.
15. Sabin, A. B., and Aring, C. D.: Visceral Lesions in Infectious Polyneuritis (Infectious Neuronitis, Acute Polyneuritis with Facial Diplegia, Guillain-Barré Syndrome, Landry's Paralysis). Am. J. Path., 17:469, 1941.
16. Santi, M.: Poliradicolo-nevrite con dissocizione albumino-citologica del liquor (sindrome di Guillain-Barré). Riv. di pat. nerv., 53:156, 1939.
17. Saurer, A.: A Case of Polyradiculoneuritis. Brit. Med. J., 2:11, 1942.
18. Shaskan, D., Teitelbaum, H. A., and Stevenson, L. D.: Myelo-Radiculoneuritis with Cell-Protein Dissociation. Arch. Neurol. & Psychiat., 44:599, 1940.
19. Strauss, I., and Rabiner, A. M.: Myeloradiculitis: A Clinical Syndrome, with Report of Seven Cases. Arch. Neurol. & Psychiat., 23:240, 1930.
20. Taylor, E. W., and McDonald, C. A.: A Syndrome of Polyneuritis with Facial Diplegia. Arch. Neurol. & Psychiat., 27:79, 1932.
21. Unpublished data: personal communication to author.

THE SENILE AND PREMATURELY SENILE SKIN

F. Ronchese, M. D.

THE clinical appearance and histologic changes of the skin at various ages are due partly to physiological and partly to pathological changes. The pathological changes are due mostly to blood vessel modifications. It is difficult to determine how much physiology and how much pathology enter into making the skin of the aged.

The senile skin shows a thinned epidermis, especially of the malpighian layer. The granular layer has almost disappeared. The horny layer is almost the same as in the young, or has increased in thickness to form hyperkeratoses. The basal layer is intensely pigmented. The dermal papillae are flattened and very few elastic fibers are left. The subcutaneous tissue has lost most of its fat. The hair follicles are atrophic, the arrectores pilorum are undergoing degeneration, and the sebaceous and sudoriparous glands are atrophic and diminished in number. However, the aged skin often perspires and produces a normal amount of cutaneous fats.

An interesting phenomenon is the formation of the cutaneous folds. At 20 years of age the face is free of wrinkles. Gradually, toward the age of 50, the skin of the hands becomes rough and dry, and hyperpigmented keratotic spots appear. The neck becomes the site of deep interlacing folds outlining rhomboidal spaces. These folds (cutis rhomboidalis nuchae) become deeper and deeper toward the age of 80. From the edentulous mouth the folds assume a peculiar radiating disposition, strikingly resembling the radiating scars of prenatal syphilis (Fig. 1). The "petit vieux" (little old) face of prenatal syphilis is a well-known major symptom of the disease. Old age hyperlaxity of the skin (dermatochalasis) is well represented in the drapery-like folding of the skin of the face and genitals.

Some senile dermatological conditions are matters of common knowledge. Among these are senile essential idiopathic pruritus, kraurosis vulvae, senile ichthyosis, alopecia and canities, papillary varices (cayenne pepper spots, ruby points), senile purpura and lentigo, generalized senile atrophy of the skin, the senile wart (senile verruca, senile seborrheic keratosis), the cutaneous horn, and cancer of the skin.

Others are less well known. Such are the senile changes of the transitional mucous membranes, characterized by erythema and keratosis in patches, especially of the glans penis (erythroplasia of Queyrat), similar to leukoplakia, with erosions or ulcerations, and to the senile patches of erythema and scales of

Another less well-known condition is the fatty degeneration of the senile skin which is most marked at the nape of the neck (cutis rhomboidalis nuchae),

DR. F. RONCHESE, Providence, Rhode Island, is Instructor in Dermatology of Boston University School of Medicine and a diplomate of the American Board of Dermatology and Syphilology.

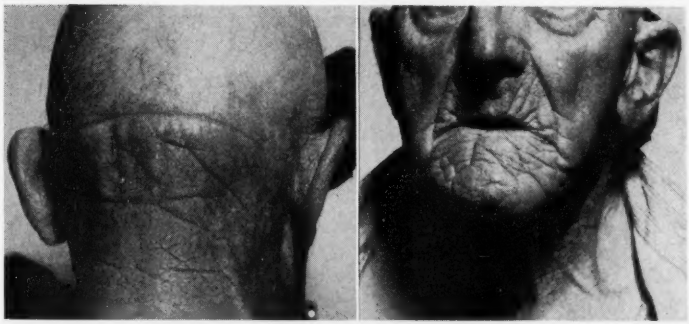


Fig. 1. Cutis rhomboidalis nuchae (a senile fatty degeneration of the skin) and the radiating folds of the edentulous mouth at 80.

also called imbibitio lipoidicae telae elasticae degeneratae (Urbach), and lipoid degeneration of the elastin (Kreibich). (See Figure 1.)

It is easy to complain about the deficiencies of the aged; but let us glance at the dermatologic conditions severely affecting the young that are virtually spared to the aged. The acne of adolescence, the plague of youth, often in the form of indurata or conglobata, which is most distressing and disfiguring just at the age when good facial appearance is most appreciated, is something the aged will never know, either as something new or as a recurrence. If psoriasis has not appeared by middle age it is unlikely that it ever will. The same can be said of tuberculosis of the skin, lupus erythematosus, and the allergic dermatoses.

While a baby skin is seldom encountered in the aged, senile manifestations are occasionally seen in the skin of the young or the middle aged. The previously mentioned "petit vieux" wrinkled face of prenatal syphilis is a progeria manifestation induced by the disease. The finding in the young of a skin cancer of either the keratinizing or nonkeratinizing type may be considered a manifestation of senility.

Fig. 2. Blepharochalasis (hyperlaxity of the skin of the eyelids).

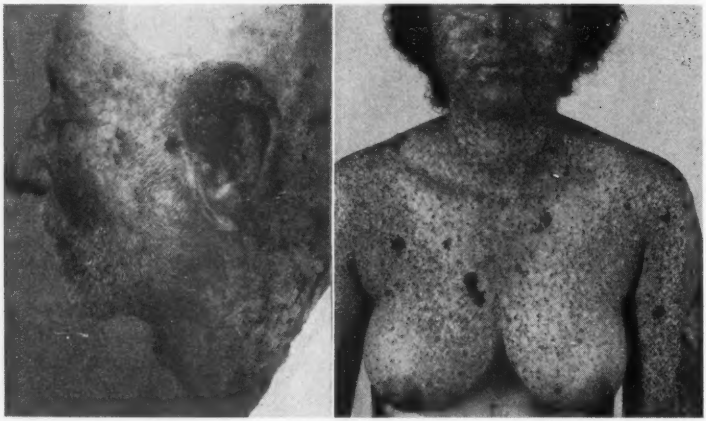


Fig. 3. The skin of a 90-year-old man and of a 25-year-old woman with xeroderma pigmentosum.

Hyperpigmentations, lentigos, keratoses, cheilitis, telangiectasis, widespread keratinizing and nonkeratinizing epitheliomatosis, and melanosis of the skin, as seen in xeroderma pigmentosum, are manifestations of dermatologic progeria (Figs. 3, 4). In xeroderma pigmentosum, however, a normal amount of subcutaneous fat is present and consequently the wrinkling of the skin is moderate.

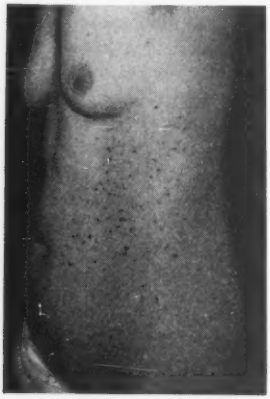


Fig. 4. Senile seborrheic keratoses in a 35-year-old woman (prodermatogeria).

Blepharochalasis, or hyperlaxity of the skin of the eyelids, sometimes seen in adolescent girls, is a manifestation of progeria.

Dermatochalasis, or hyperlaxity of the skin, seen as one of the symptoms of dermatorrhexis, also called Ehlers-Danlos syndrome, characterized by a peculiar laxity of the skin, occasionally encountered in childhood, perhaps is a manifestation of progeria. Progeria will eventually be relinquished by the pediatrician and the general practitioner to the geriatrician.

SOME PROPHYLACTIC SUGGESTIONS REGARDING THE SCIENCE OF GERIATRICS

W. Raney Stanford, M. D., F. A. C. P.

THE problem of the aging person has grown more important because of the increased life span. Stieglitz (3) states that in 1850 the average life expectancy at birth was 40 years, that in 1900 it had risen to 47 years, and that since the turn of the century the rise has been quickened; in 1930 life expectancy was about 60 years for white Americans, and in 1940, 63 years. Medicine has done so many things to increase man's life span that it would be next to impossible to mention all of them.

The doctor's battle against disease has been a long and arduous one, and yet most of his progress has been made in the last seventy-five years. The conquest of many diseases has added to the length of man's life. The battle against malaria has added its bit, though malaria has not yet been conquered; the battle against typhoid fever, diphtheria, tetanus, and pneumonia and the fight surgeons have made against the acute inflammatory conditions that occur in the abdomen and elsewhere in the body have contributed.

It makes no difference how early in a child's life the battle against disease has been fought, the result is the same. A battle won against disease in the large percentage of cases increases the life span. The science of geriatrics is so intimately tied up with pediatrics, internal medicine, and with all phases of medical practice that it cannot be separated from them. Old age is made possible by good pediatrics and good medical practice. Of course there are other factors than the practice of medicine that make old age possible. There are certain protected individuals who, because of their freedom from accident, the sheltered position they hold in this world, and their freedom from exposure to disease, are able to live out their full span of life with very little medical attention.

The factors that so interfere with the normal cellular chemistry as to initiate the progressive involuntary changes that result in senescence are listed as follows by Davis (2): heredity; the health and nutrition of the parents at the time of the child's conception; the health and nutrition of the mother during pregnancy and while nursing the baby; the mild or severe, acute or chronic, illnesses that the individual may have at any time during life; nutrition, its quantity and quality, and its relation to the needs of the particular individual at all periods of life; the environment in which the individual grew up, worked, and lived; his occupation, habits, and mode of life; and the particular gases, dusts, chemical compounds, and drugs ingested inadvertently while at work or play, and on prescription.

DR. WILLIAM RANEY STANFORD of Durham, North Carolina, is a member of the consulting staff of Lincoln Hospital, on the medical staff and chief-of-service at Watts Hospital, and a member of the visiting staff of Duke Hospital. A graduate of the University of Pennsylvania Medical College, he holds memberships in the American Association of the History of Medicine, the American Medical Association, and the Southern Medical Association.

Davis says that these and other factors affect the rate of growth, the duration of maturity, and the onset and progress of senescent changes. He further states that the problems of senescence will undoubtedly be solved when cellular chemistry can explain the involutionary changes that characterize it.

There is another science, namely, eugenics, which would promise much in the way of long life if we observed its tenets. Unfortunately, we do not. Oliver Wendell Holmes once said that if you are setting out to achieve three score years and twenty the first thing to be done is to advertise some years before birth for a couple of parents belonging to long-lived families. That, naturally, is impossible; but even some of the possible things are not done. Who can imagine the modern youth of today paying any attention to eugenic considerations when he or she decides to choose a mate?

However, certain selective processes go a long way toward protecting the unborn millions from the dangers of bad heredity. The ugly, the congenitally deformed, and the mentally deficient often fail to marry. In other words, the physical and mental defectives find it more difficult to marry than the normal person, and in this way society is protected to some degree from certain inherited defects, though statistics show that there are a number of illegitimacies among the mentally deficient.

Nevertheless, a tremendous number of diseases are regularly transmitted from parent to child and on down the line. There is no doubt that some diseases run in certain families: high blood pressure; epilepsy and its first cousin, migraine; certain forms of deafness; certain types of blindness; certain neurological conditions, such as hereditary cerebral ataxia; probably even cancer; the tendency toward diabetes and possibly tuberculosis; and other diseases too numerous to mention.

Many of these inheritable diseases could be avoided by the correct practice of the science of eugenics. No diabetic should marry into another diabetic family. No member of a family in which there is epilepsy should marry into another epileptic family. Children from hypertensive families should not marry into other hypertensive families. In fact, the human race of the future should be as sensible and practical about taking its mate as it is in breeding its livestock. Of course, so practical a view of the matter will probably not be taken for a long time to come.

The practice of geriatrics is dependent to a great degree upon the type of pediatrics practised. Therefore it is proper that the onus of the whole problem should be placed on the doctor who first treats the child. It is his duty to see that the child, up to the age of twelve, receives all the prophylactic types of medication that this modern age calls for; in short, that the child has been protected in every way possible to medical science.

Next we come to the doctor who treats the child through the adolescent period into young adulthood. It is up to him to carry on the good work started by the pediatrician. It should be his concern to protect the adolescent child from every bad element to which he is subject—venereal disease, bad sexual habits, late hours, too much smoking and drinking, and improper eating habits. There is another specialist who should play an increasing part in caring for the adolescent, namely, the psychiatrist. There is no question that adolescence is a transi-

tion period in which we often see bad personality traits emerge and bad living habits developed. Often we see at this time the first appearance of that dreadful disease known to us as schizophrenia, or dementia praecox. It is to be hoped that the psychiatrist of the future will be an everyday sort of person, well versed in his subject and equipped with all the armamentarium of his specialty and with enough common sense to know how to use it.

We have now carried the individual through infancy, childhood, and adolescence. The 20 to 50 age period is very important and has much to do with longevity. This is the making or breaking period of the individual's existence. As far as the male of the species is concerned, it is the period that spells success or failure in the business or professional world. It is the period in which he engages in a mad scramble for existence, for mediocrity, or, if he belongs to a select few, for success. It is the period of long hours, hard work, sedentary habits, heavy eating, and at times, heavy drinking and smoking. It is in this period that the circulatory diseases first begin to manifest themselves and high blood pressure and all the other elements of hypertensive cardiovascular disease, gastric and duodenal ulcers, malignancies, renal disease secondary to arteriosclerosis, and many other diseases have their beginning. Women, too, are subject to these diseases and also to the hazards of the child-bearing period, which ranges roughly from 20 to 40.

The doctor can do much in this period to prolong life. It would be well to pause here to say that prophylactic medicine is almost as important in this age period as in childhood. In the fifties and in each decade thereafter one sees more and more cardiovascular disease and more and more carcinomata. Diabetes still occurs, and tuberculosis, essentially a disease of youth, comes back and often is the terminal disease of old age. Gallbladder disease, which usually appears around 40, is seen often in the period from 50 on. Prostatic disease develops also, both benign prostatic hypertrophy and the much more serious disease, carcinoma of the prostate. It is in the final years of this period that we see so often the dreadful effects of cerebral sclerosis, with its associated dementia, paralysis, incontinence, and all its numerous symptomatology. The doctor's problem in this period goes to make up the science of geriatrics. The medical care of the individual from 50 on really takes in all the care of the aged.

The care of the aged individual is made lighter in a way if he has been properly cared for up to the time he is 50. However, the whole problem has been made much more complicated because the improved medical care of the individual from infancy on has made it possible for many more individuals to reach that advanced period we call "old age." It is not necessary to discuss the treatment of the various diseases encountered in old age. Treatments differ somewhat, but the science of geriatrics is fairly adequately known by any good doctor. Most doctors know that appendicitis is more serious in the aged than in the young adult, that pneumonia is easily contracted by the aged, and that one cannot keep old people in bed indefinitely. Most surgeons know that certain anesthetics must be used with care in the aged, especially the hypertensive aged. Spinal anesthesia in the hypertensive arteriosclerotic individual often causes a dangerous drop in blood pressure, thrombosis, and death. In the hypertensive, gas anesthesia may cause a dangerous increase in blood pressure. When

given in too large doses ether may cause pneumonia in the aged, just as in younger persons.

A few general measures should be kept in mind when treating old people. Not only should they be examined regularly, but their whole mode of life should be examined. Stieglitz stresses the importance of periodic health inventories. He brings out another point that is very important, namely, the importance of seeing that the patient benefits from these examinations. "A complete diagnostic study recorded on the clinical record does the patient little good," he remarks. The writer recalls one particular patient who came in for a routine physical examination and stated that he had been having yearly examinations just to have the doctor tell him he was all right. His doctors had evidently done just that, because the patient had several correctible defects.

The doctor should investigate the way the older patient eats, the way he sleeps, the amount of exercise he takes, and the hours he works. Especially should he look into the patient's psychological environment. Contentment, happiness, and security are as essential to the health of the aged as are good food and protection from great variations in temperature. When one realizes how alone some of these old people are one recognizes how difficult it is for them to keep up their standard of health. It is very important that the aged do not overeat. Boas (1) says that a person past 70 who lives a quiet life should consume between 1500 and 1800 calories a day. He believes in cutting the protein down to 45 grams instead of the usual 75 grams. It is important to keep these patients at an optimum weight. This may be done by restricting fattening foods, especially carbohydrates, and telling them to leave the table hungry; however, if they do not lose weight under such a regimen they should be put on a definite diet. In arranging their diets one should be careful to see that they receive an adequate amount of fundamental vitamins. In most instances it is wise to reinforce any diet in this period with vitamins, for the diets of old people are often deficient in vitamins. Moreover, these patients often fail to absorb vitamins as they should. One should be always on the lookout for signs of vitamin deficiency—red, beefy tongue, neuritis, skin rashes, cheilitis, capillary hemorrhage, and possibly even cataracts. If these people are not taking adequate amounts of milk they should be given calcium in the form of calcium gluconate or dicalcium phosphate.

Exercise is tremendously important. Every aged person should if possible take an adequate amount. However, stress and strain of all sorts and fatigue should be avoided. Old people should not run up stairs, though it is quite all right for them to climb stairs. As good an index as any to the amount of exercise they should take is that they should avoid precordial distress, dyspnea, and fatigue.

Temperature is also important. According to Boas, temperature regulation is not as efficient in old people as in younger ones. They should therefore avoid both extremes of temperature. It is never wise for elderly persons to exercise vigorously in cold weather, for they are prone to develop coronary occlusion under such conditions.

Boas also emphasizes the importance of sleep. An older person ordinarily does not require as much sleep as a younger one. However, some people as they

grow older sleep more, sometimes as long as twelve hours. The amount of sleep, of course, depends upon the individual. Some people who are subject to nocturnal dyspnea undoubtedly suffer more if they are allowed to sleep for too long a period. It would seem feasible to awaken such individuals occasionally before they become too depressed by sleep. An afternoon nap, with its short period of sleep, is refreshing to them.

In closing, I should like to add a few words on another subject. Physical education is one of the most important things of the future, and if we doctors are smart we shall play our part in this great movement.

The war has shown us that physical education is necessary. The writer believes that the United States, with its haphazard system of athletics, was probably in a better position to fight this war than any other nation among the Allies, with the possible exception of Russia. Years ago, when our fathers were boys, and even when some of us were boys, there was enough hard, rugged work for us to do to keep us in shape physically, but this last generation of boys has had to depend on unsystematic physical education.

However, if this country is wise, it will not depend upon such a program in the future. Plans should be formulated to begin with our six-year-olds a physical education program extending through the school years. Such a program will mean the employment in our schools of more physical education experts and the use of our doctors for the medical examination of these children. There is little use in sending a boy to school and graduating him from the high schools and colleges of this country unless he is given a sound body in which to carry his trained mind.

So, it should be re-emphasized that physical education is going to be one of the greatest prophylactic influences in the science of geriatrics. America should have a safe and sane physical education program—one that develops the individual physically, and yet does not overdevelop him. It is going to be up to the doctors to teach the young men and women who graduate from our high schools and colleges how to carry on this physical education program throughout their lives. When the time comes, we should be trained and ready.

SUMMARY

The whole medical life of man has been touched upon, for no writing on the subject of modern geriatrics would be complete without discussing the medical treatment of the individual before he reaches old age. Much of our geriatric practice is made possible by the earlier treatment of the patient. It is the writer's hope that the science of geriatrics will so improve that sometime in the not too distant future we shall be able to say with Browning:

Grow old along with me!
The best is yet to be,
The last of life, for which the first
was made.

REFERENCES

1. Boas, Ernst P.: The Treatment of the Patient Past Fifty. Chicago: Year Book Publishers, 1941 (rev. ed., 1944).
2. Davis, N. S.: Factors Which May Influence Senescence. Ann. Int. Med., 18: 1, 81-88, 1943.
3. Stieglitz, Edward J.: Pertinent Problems of Geriatric Medicine. Ann. Int. Med., 18: 1, 89-95, 1943.

CARDIOVASCULAR DETERIORATION

Henry L. Ulrich, M. D., F. A. C. P.

GERONTOLOGY, one of the youngest of our medical sciences, is strictly speaking not a science at all, but a conglomeration of facts, ideas, impressions, and fancies. However, all our sciences have had a similar beginning. The present intense interest in this phase of medicine has been forced upon us largely by the implications to society of the increasing numbers of the old age group. Heretofore we have been busy primarily with diagnosis, nosology, and prevention of disease. Now we enter upon another phase, a corrective phase, in which we must detect the processes that hasten old age and encourage those that retard it.

Professor Anton J. Carlson (4) of the University of Chicago lists eight principal aging processes, as follows: gradual tissue desiccation; gradual retardation of cell division, capacity of cell growth, and tissue repair; gradual retardation in the rate of tissue oxidation; cellular atrophy, degeneration, increased cell pigmentation, and fatty infiltration; gradual decrease in tissue elasticity and degenerative changes in the elastic connective tissue; decreased speed, strength, and endurance of skeletal neuromuscular reactions; decreased strength of skeletal muscles; and progressive degeneration and atrophy of the nervous system, impaired vision, hearing, attention, memory, and mental endurance.

Of these processes almost all students emphasize what is termed desiccation of the tissues. In its usual application, this means a loss of water. Where does this desiccation have its beginning? In the nucleus, in the cellular protoplasm, or in the cell membrane? In one of these three areas desiccation has its inception. It has been definitely shown that intercellular fluids maintain their equilibrium in old age (3). Wells (10) makes a good case for an analogy between the aging of colloids in vitro and that of colloid systems in the body.

Given a well balanced group of systems—skeletal, muscular, nervous, cardiovascular, and endocrine—the aging process goes on in an orderly fashion. Any weakness in any of the systems due to genetic influences will hasten the aging process.

Geriatrics is the branch of medicine that detects these imbalances and endeavors to correct them. Geriatrics must also be able to differentiate between growth—the normal process of senescence—and the environmental and accidental factors; that is, the diseases of old age. Geriatrics directs toward individuals its efforts toward preventing the diseases of old age, in contrast to the public health effort, which is concerned with mass prevention.

THE HEART

At birth, with the descent of the diaphragm and the first inhalation of air into the lungs, the left heart starts on its job of pumping the blood through the

DR. HENRY L. ULRICH, Minneapolis, is Professor of Clinical Medicine at the University of Minnesota. As his article indicates, his specialty is cardiovascular diseases. A graduate of Johns Hopkins Medical School, Dr. Ulrich is a member of the American College of Physicians and the Central Society of Clinical Research.

systemic circulation and the right heart its job of pumping the blood through the pulmonary system. At that moment too the aging process has begun, not only chronologically but physiologically as well.

The heart continues to grow long after the body stops growing. There are changes in the vascular supply, in the valves, and in the epicardium and endocardium. These changes closely resemble the changes that occur in the vessels throughout the body and are based on similar causes.

The heart is a muscle. Muscle cells, like nerve cells, do not multiply after birth. The growth of the heart is in the size of the individual fibers. Fat is deposited around the heart, particularly along the arterial grooves and auricular ventricular grooves. The valves grow more fibrous with corresponding increase in rigidity. The quality of the elastic tissue changes. There is deposition of lipoids and calcium. The left side of the heart is more involved in these changes than the right. The inner lining of the heart thickens. The tips of papillary muscles tend to thicken.

The striation of the muscle cells is more conspicuous as growth proceeds. Late in life it tends to disappear. Pigment is laid down at the poles of the nuclei. When this pigmentation is marked the term brown atrophy is applied to the condition. In the young the nuclei are vesicular within smooth nuclear membranes. Later they increase in size, change their shape, and take on more stain. The amount of elastic tissue increases and varies with age. Some claim they can estimate the age of the heart in terms of the amount of elastic tissue present. The increase is more evident in the auricles than in the ventricles.

The coronary arteries undergo change. The ramus descendus anterior matures earliest. Changes in the ramus descendus posterior may lag behind those of the anterior five to ten years. The point of predilection for closures and thrombus formation lies 1 cm. below the origin of the anterior descending branch.

The usual view is that these changes are due to alteration in the internal elastic membranes of the intima. These membranes split early in life, while the intima constantly changes in elastic substance and ground substance until it appears wholly disorganized. At the same time cholesterol and calcium are being deposited. Further studies of the metabolism of the sterols and the function of the hormones will add to our knowledge of why these changes occur. The coronaries are subject to these changes to a far greater degree than are the radials, which are no further developed in sclerosis at the age of 65 than are the coronaries at 20. It is unlikely that the number of arteries increases during life. As Cohn (5) writes: "At its maximum, the heart muscle has increased about twenty times its weight at birth, the total area of the arteries only 6 or 7 times. But if the square (that is, the area of the cross sections of the arteries) is raised to the cube (the volume of the muscle) the correspondence in dimensions becomes clearer."

PHYSIOLOGICAL ASPECTS

The rate of the heartbeat decreases with advancing years. At the third decade it reaches a plateau and declines during the fifth decade. The rhythm of the heart tends to be regular, but as the years advance irregularities appear.

*In the comments made in this section I wish to express my indebtedness to Alfred E. Cohn, whose ideas, as stated in Chapter 7 of *Problems of Ageing* (Baltimore: Williams & Wilkins Company, 1942, E. V. Cowdry, editor), fit in well with my own experiences.

THE GERIATRIC APPROACH

The most important items in assessing cardiovascular values in an older person are the extent of arteriosclerosis and the size of the heart. The six-foot X-ray silhouette gives an approximation of the size of the heart and also brings out size, contour (aneurysms), and elongations (ectasia) of the aorta and shows up calcific deposits in the valves of the heart and the walls of vessels. Palpation of peripheral vessels does not give much evidence of sclerosis unless there is calcium present (Mönckeberg's sclerosis). Palpation of the radial does give an idea of tension, but not of thickening.

The only way by which a geriatrist can discover dysfunction in the cardiovascular tree of an older person is by objective or subjective symptoms. In the heart these symptoms are manifested by coronary insufficiency, which induces left or right ventricular failure, acute or chronic, mild or larval, nocturnal dyspneas, and angina pectoris. The dyspnea must be distinguished from that caused by emphysema, obesity, and lack of tone (flabbiness). The dramatic features of coronary closure with infarction or infarction without thrombosis (irreversible anoxemia) are much more common between the ages of 45 and 65 than in the older group.

The specific treatments for all these conditions are well known. However, a word of caution is appropriate. The treatment of the older person must be carried out in a much gentler fashion than that of the younger one. Rest in bed should not be prolonged unduly. All the resources at the physician's command must be employed to evaluate the integrity or dysfunction of the heart. Comparative records of periodic examinations, including blood pressure readings, electrocardiograms, and vital capacities, are essential.

The circulatory disturbances in the extremities, notably the legs, are intermittent claudication and complete or partial closure of a vessel, leading to gangrene. Acute closure of an artery may be due to an arteriosclerotic plaque, inviting a thrombosis with complete obstruction. This must be distinguished from embolic phenomena. The treatment of the milder symptoms consists of postural maneuvers and exercise to the point of pain. Of the vasodilators alcohol is probably the best. Tobacco is decreased or interdicted. A daily sitz bath at 94° for twenty to forty minutes is beneficial. It is questionable whether tissue extracts, hyperemia, or oscillatory apparatus are of value in the senescent type of sclerosis. Gangrene is a surgical problem.

Hypertension, so common in this group, is considered one of the accelerators of arteriosclerosis. Despite our Pages, Grollmans, Goldblatts, Bells, and Scotts, the mystery of why the arterioles in one area or in all areas go into an irreversible spasm is unsolved. Later, as this spasm is sustained, an anatomic barrier (arteriolar sclerosis) is formed and fixation of the diastolic pressure is established. The question of what the limits of normal arterial pressure are is still under discussion. The insurance standards are lower than the clinical standards. However, the predominant opinion is that the blood pressure goes up with advancing years. Willius (11) was impressed by this finding in his study of 700 males. Russek (9) in his study of 1000 males between 60 and 95 notes that there was an increase in systolic and pulse pressure with age. In his group the viability of those with systolic hypertension was virtually the same as of those with normal

elastic layers, accompanied by deposits of collagen. Hyaline is formed later. Fat and calcium are also collected in these areas. The media is made up mostly of smooth muscle, poor in elastic fibres. With age there is an increase of collagen fibres (medial fibrosis), with atrophy of muscle fibres. Atrophy of the media is seen in areas where there has been earlier hypertrophy of the media. "Intimal thickening apparently precedes medial atrophy," according to Bell (2). Calcification of the media (Mönckeberg's sclerosis) occurs most frequently in the lower extremities.

In the older literature, characterized by the anatomical approach, attempts were made to differentiate the various kinds of scleroses: atherosclerosis, arteriosclerosis, intimal sclerosis, and medialsclerosis. Clinically, hypertensive sclerosis and decrescent sclerosis were recognized. It is a descriptive terminology based on the assumption that sclerosis is a specific disease. In recent years emphasis has been placed on functions as a cause of sclerosis. If we adopt the idea that the underlying cause of sclerosis is "wear and tear," we must accept the hypothesis that changes in the vessels are merely forms of adaptation to work, with overcompensation occurring in critical areas. If one of the functions of the walls of the vessels is to keep the endothelial lining intact, the changes in their thickness or thinness must be a response to this demand. Moschcowitz (8) defines arteriosclerosis as "a progressive and irreversible affection of the arteries in which hyperplasia of one or more structural elements is a primary reaction, with deposits of lipoids, collagenous tissue, hyaline, and calcium as a secondary reaction, the totality of both components resulting in thickening, dilatation, deformity, and loss of elasticity of the walls." He emphasizes that "normal intravascular pressure is an indispensable factor in the production of sclerosis, not only in the arteries but of all the components of the vascular system, including the veins, the capillaries and the chambers of the heart." He comments further that intravascular pressure is not the only agent, but evidence points strongly to its being a primary one. To prove this point he calls attention to pulmonary arteriosclerosis, which is always (so he states) due to increased pulmonary pressure. He mentions the evidence in coarctation of the aorta, in which the vessels of the upper part of the body show more sclerosis than those of the lower. The secondary or conditioning factors are the chemical composition of the blood, intravascular stresses, and perivascular resistance. The last two factors have to do with localization and distribution of the lesions.

The exciting monograph of Winternitz (12) calls attention to the extensive vascular supply to the arterial walls. The text and illustrations add a new and challenging chapter to the search for the origin of sclerosis, and particularly to the genesis of disease processes in the vessel walls. "It is obvious," writes Winternitz, "that any discussion of the morbid processes in vascular disease cannot be more than speculative in character when the knowledge concerning the blood supply to the vessel wall is in such an uncertain stage. . . . The distribution and extent of mural vascularity is a function of both age and disease. The vessels of senile individuals which show the usual general thickening but no extensive proliferative changes in the intima nevertheless may be quite vascular. The diseased vessel wall is markedly vascular at any age."

Extrasystoles and brief attacks of fibrillation may be a part of the normal aging process. The consumption of oxygen decreases with advancing years. This suggests changes in the constitution of the muscle fibers. Protein, carbohydrate and respiratory catalysts, enzymes, and coenzymes may play a part in this decrease. The functions of the nerves to the heart seem to change with age. The carotid sinus becomes more sensitive, the neuromuscular juncture less capable of being influenced. Is there less discharge or manufacture of acetylcholine or of sympathin?

Electrocardiographic changes are also observable. The PR interval tends to prolong. The QRS is widened and with it the RT interval tends to lengthen. The T_1 may be inverted. The axis deviation between the left heart and the right is also changed. The voltage may decrease.

CLINICAL ASPECTS

The second pulmonic sound is accentuated up to the first twenty to twenty-five years of life. Does this mean the pulmonary circuit has a relatively higher pressure in youth than in later years? Or is the switch over to the second aortic evidence of progressive loss of elasticity in the great vessels? As age advances a systolic murmur may appear at the apex (mitral ring dilatation) and a systolic murmur may appear over the aortic area due to the thickening of the aortic ring. Willius (11), in a study of 700 patients 75 to 96 years of age, calls attention to the various changes found in their hearts. There were 385 (55 per cent) who showed clinical evidence of cardiac dysfunctions; 315 (45 per cent) showed congestive failures, and more than half of these had dominant hypertensive heart disease. There was evidence of coronary disease in 172, or 44 per cent. Of these, 124 were without painful seizures, 47 had the anginal syndrome, and one coronary thrombosis. Of the remainder of the group three had syphilitic aortitis, and one nonsyphilitic aortic insufficiency.

Let me add that in a group of persons between 50 and 75 years of age there would be a larger proportion of coronary diseases and enlarged hearts (hypertension). Willius's comment is: "From the study of aged patients one gleans the impression that the majority of persons, even in the presence of evident heart disease, possess hearts of unusual quality. This impression becomes strengthened by the fact that only 85 patients (12.1 per cent of the complete series) had congestive heart failure. The heart, impaired or unimpaired by diseases, that permits continuation of life to and beyond the seventy-fifth year is an organ of unusual quality."

THE PERIPHERAL ARTERIES

There is a most exquisite adaptation of function in the arterial tree from the aortic ring to the arterioles. The central arteries are predominantly elastic in type. Toward the periphery in proportion to their lumen they become more muscular and under the control of the vasomotor nerves by which a definite steady flow is guaranteed to the capillaries. The sclerosing process in the elastic arteries consists mainly in the loss and rearrangement of elastic tissue with deposits of lipoids and calcium and with dilatation and elongation (ectasia). Calcification may occur also, but not as commonly as it does in the peripheral vessels. In the muscular arteries the intima thickens by a splitting up of its

pressure. Of the total number 647 had systolic pressures over 140 mm. and only 30 per cent had diastolic pressures over 90 mm. The group with diastolic hypertension had a much poorer prognosis.

Diabetes mellitus is also considered an accelerator of arteriosclerosis. Bortz (2) writes: "At the Mayo Clinic arterial insufficiency in the lower extremity was found eleven times more frequently in diabetics than in nondiabetics." Coronary sclerosis is more common in diabetics. With low fat and high carbohydrate diets the lipemia so common in the preinsulin period has disappeared. Still, the impression persists that in spite of well controlled metabolism there is increased sclerosis with this disease. With impaired arterial supply and lowered resistance to infection extreme vigilance must be practised to avoid minor injuries to the extremities, particularly to the feet of diabetics.

The diseases of old age and methods of treating them are well known to internists. As yet the validity of the use of diets, hormones, and vitamins to modify the aging process has not been proved. In ameliorating or retarding cardiovascular deterioration the best zone of attack is possibly in the period of adolescence and maturity, when social, personal, physical, and mental habits that might lessen the sclerotic processes and even modify the accelerators, hypertension and diabetes, can be formed or modified. Such changes as might be suggested in these habits would vary with the individual. This procedure would entail periodic examinations and conferences in which psychosomatic tendencies could be corrected and the patient encouraged to live moderately and to temper work with play and well chosen vacations. The clinician must develop confidence in living and at the same time avoid instilling fear of disease.

Toward the person already in senescence our aim should be to make him as comfortable physically as possible and help him maintain as much serenity as lies in his power. I would suggest that, along with the recent literature on gerontology, the physician read G. Stanley Hall's *Senescence,* published in 1922.

As suggesting my own point of view I should like to quote Longcope (7), who writes as follows in the Johns Hopkins Hospital bulletin: "As I grow older, I have less and less sympathy with the conscientious efforts merely to extend life in old age. The curtailment of activities, the tender nursing, the humane and assiduous attention of doctors are likely, too frequently, to carry the aged tottering by the danger point and leave them helpless doddering wrecks of humanity. Having arrived at this stage it seems beyond their power or desire to let go the one thing they possess, the shred of life that ties them uselessly to earth. The philosophy of Stevenson's 'Aes Triplex' suits me better. He says, 'We do not, properly speaking, love life, but living.' And again, 'Does not life go down with a better grace, foaming in full body over a precipice, than miserably straggling to an end in sandy deltas?' It is the duty of the doctor to preserve, not only health and life, but joy of living; and if most of us had to make our choice we would take the latter. Why ward off death if in the attempt we kill living? But these, perhaps, are matters over which we have but slight control. The vigorously minded patient knows the hounds are in pursuit and keeps up the chase in spite of our earnest protests and our pleadings to seek shelter."

REFERENCES

1. Bell, E. T.: Arterial Sclerosis of the Abdominal Viscera and Extremities. Arteriosclerosis: A Survey of the Problem, E. V. Cowdry, editor. New York: The Macmillan Company, 1933.
2. Bortz, Edward L.: Diabetes Mellitus. Geriatric Medicine, Edward J. Stieglitz, editor (Chapter 15). Philadelphia: W. B. Saunders Company, 1943.
3. Cannon, Walter B.: Ageing of Homeostatic Mechanisms. Problems of Ageing, E. V. Cowdry, editor (Chapter 22). 2d ed. Baltimore: Williams & Wilkins Company, 1942.
4. Carlson, Anton J.: The Physiology of Aging. Northwest Med., 21:1, 1943.
5. Cohn, Alfred E.: Cardiovascular System and Blood. Problems of Ageing, E. V. Cowdry, editor (Chapter 7). 2d ed. Baltimore: Williams & Wilkins Company, 1942.
6. Hall, G. Stanley: Senescence. New York: D. Appleton & Company, 1922.
7. Longcope, W. T.: Methods and Medicine. Bull. Johns Hopkins Hosp., 50: 4, 1932.
8. Moschcowitz, Eli: Vascular Sclerosis. New York: Oxford University Press, 1942.
9. Russek, H. I.: Blood Pressure in the Aged. Am. Heart J., 26:11, 1943.
10. Wells, H. Gideon: The Chemistry of Arteriosclerosis. Arteriosclerosis: A Survey of the Problem, E. V. Cowdry, editor. New York: The Macmillan Company, 1933.
11. Willius, F. A.: The Heart in Old Age. Am. J. Med. Sc., 182: 1, 1931.
12. Winternitz, W. C., Thomas, R. M., La Compte, P. M.: The Biology of Arteriosclerosis. Springfield, Illinois: Charles C Thomas, 1938.

Middle Life and Old Age.
J. Smithline. *M. Rec.*, 158:409-11 (July), 1945.

Longevity is a vascular question, well expressed in the axiom that "a man is as old as his arteries." Death comes through this portal. The onset depends on the quality of arterial tissue (vital rubber). In treating arteriosclerosis the physician must take the symptoms of exhaustion as a guide. Clinical and experimental studies of metabolism and the influence of vitamins open up new avenues in retarding the aging process. Low caloric and unbalanced diets, weighted by large quantities of vitamin B and potassium and sodium phosphate, prolonged the life of animals. The appetite-stimulating properties of vitamin B1 and its tonic effect upon the gastrointestinal tract make it a valuable adjuvant in the treatment of the senile.

Obdurate constipation is a frequent phenomenon in old age. Daily enemas are helpful. If pharmaceutical aid is necessary glysennid may be used; it is especially indicated in elderly people. One tablet daily should be administered.

Degeneration of the ductless glands in old age usually produces a condition of autointoxication with decline of the antitoxic power, shown by the adrenal glands.

A NEW METHOD OF LOCAL TREATMENT OF RHEUMATOID AND TRAUMATIC AFFECTIONS OF THE JOINTS

With Emphasis on a New Approach in the Management of Arthritis and Allied Conditions

Otto C. Kestler, M. D.

For years we have been searching for an efficient method of local treatment of rheumatoid and traumatic affections. It has been proved that any form of local heat is beneficial in the treatment of rheumatoid arthritis, so-called osteoarthritis, and periarthritis. Local treatment of these conditions serves two purposes, namely, to overcome pain and spasm and to act upon the disease itself. Hot baths, warm compresses, electric bulbs and pads, diathermy, short wave, and mud packs are all helpful as palliative measures. In most cases, however, they have no lasting effect and bring no prolonged relief.

Accordingly, it was necessary to look for a more effective form of local treatment: one that would be more helpful to the patient and, in certain cases, would prove to be the only therapeutic measure capable of inducing a striking clinical improvement in these ultrarefractory conditions.

Radioactivity seemed to be the answer to this problem, and the method of alpha-ray therapy was devised. An ointment* is obtained by incorporating radon, the first disintegration product of radium, in a fatty carrier. In this form it is possible to administer alpha-ray therapy locally and directly to the affected area. Owing to the penetration of lanolin into the deeper layers of the skin and the osmosis of the gaseous radon, the deeper tissues are submitted to the action of the alpha rays, which are absorbed by 0.05-0.10 mm. of the skin.

As a result of its diffusion in the deeper layers, it is possible for the radon gas to radiate the affected smaller joints. Owing to the disintegration of the radon in situ, the corpuscular bombardment of alpha radiation can also exert its biologically stimulating, antiphlogistic, and analgesic effect.

The radon, in undergoing transformation, emits only infinitesimal amounts of beta and gamma radiations. For practical purposes the biological effect of these radiations is close to nil; for if we apply to a surface of 100 square centimeters radon ointment with a strength of 200 electrostatic units (E.S.U.) per cubic centimeter, which is equal to 0.00728 millicuries per square centimeter, during the whole disintegration process of the radon 92 per cent of the radiations are alpha and only 4 per cent are beta and 4 per cent are gamma. The clinical results are consequently attributed to the effect of the alpha particles.

At the Orthopedic Out-Patient Department of the New York Polyclinic

Dr. Otto C. Kestler, New York, is Lecturer in the Orthopedic Department of the New York Polyclinic Medical School and Hospital.

*The radon ointment used in the treatments described in this paper was ALPHATRON, supplied by the Canadian Radium & Uranium Corporation, New York.

Medical School and Hospital 65 cases were treated by this method. Three types of cases were selected and grouped as follows:

1. The so-called chronic rheumatoid group, including rheumatoid arthritis, periarthritis, bursitis, periostitis, and epicondylitis.

2. The so-called hypertrophic arthritis or osteoarthritis.

3. Posttraumatic conditions: (a) traumatic arthritis; (b) posttraumatic, painful atrophies of bones and joints, particularly Sudeck's atrophies or cases similar to Sudeck's atrophies; (c) stiff joints, postimmobilization in plaster of Paris, or postoperative cases.

The results, as demonstrated in Table 1, were surprisingly good.

CASE HISTORIES

CASE 1. S. B., a female patient, aged 22, sustained a very severe injury to the right ankle, clinically resembling a fracture. X-rays were negative. Adhesive strapping was applied. Four weeks later she had increasing pain, swelling, and limitation of movement. The pain was unbearable. Check-up X-rays were essentially negative. We thought that, while it was not a Sudeck's atrophy, it appeared to be a posttraumatic condition similar to the Sudeck's symptom complex. The patient received 15 cc. of radon ointment, 200 E.S.U. per cc., twice a week, for six treatments, and at the end of the third week was symptom-free. Follow-up at the end of three months and six months revealed no relapse.

CASE 2. J. L., 35 years old, male, had a subtrochanteric osteotomy for an infantile coxitis of the right hip. He was immobilized in a plaster-of-Paris spica for three months following operation. Upon removal of the spica he had a very painful and stiff knee. Roentgenologically, the osteotomy was not completely fused, and it was therefore deemed inadvisable to transport him to the physiotherapy department. For this reason local treatments were prescribed. Six treatments of radon ointment were applied, 20 cc. of 200 E.S.U. each time. The pain subsided after the second application, and the stiffness disappeared after the third week.

CASE 3. J. S., 29 years of age, male, had had traumatic arthritis of the right ankle for two years. The condition persisted in spite of many forms of treatment, including all types of physiotherapy and immobilization. This case was very stubborn. While the patient improved considerably from one series of six treatments with radon ointment, two additional courses of treatment, at two-month intervals, were required before his symptoms subsided. The patient was seen again six months after the last treatment, and at that time had no complaints.

CASE 4. N. D., a male, aged 51, sustained a direct trauma to the left foot, which was struck by heavy luggage. Six months later a secondary traumatic condition developed in the area of the astragalus and scaphoid bones. This condition resisted every type of physiotherapy and immobilization. After two series of radon ointment treatments, given at two-month intervals, the patient was symptom-free. After the second series he developed an extensive pigmentation, which completely disappeared in two months.

CASE 5. Mrs. E. G. had routine treatment for epicondylitis of the right humerus, lateral condyle. Treatment included novocaine infiltration, immobili-

TABLE 1

RESULTS OF TREATING 65 CASES WITH RADON OINTMENT

	No. of Cases	Males	Females	Period of Follow-up (Months)	No. of Treatments	Symptom-free	Improved, with Decrease of Pain	Unchanged
Periarthritis humeroscapularis	13	4	9	2-8	6-12	8	4	1
Acute bursitis	4							
Olecranon	2	2	2	3-4	3- 8	2	2	...
Shoulder	2							
Epicondylitis (tennis elbow)	4	3	1	4-7	8-14	1	2	1
Periostitis of os calcis	5	4	1	4-8	6-10	2	3	...
Achillodynia	3		3	4-6	4- 8	1	2	...
Rheumatoid arthritis	3		3	6-8	10-14	...	3	...
Hypertrophic arthritis	12							
Wrist	1	2	10	3-8	8-14	2	10	...
Hip	3							
Knee	6							
Ankle	2							
Traumatic arthritis	13	7	6	4-8	6-12	9	4	...
Ankle	4							
Knee	2							
Wrist	7							
Sudeck's atrophy	3	1	2	5-8	6-12	3	...	...
Postimmobilization contractures	5	2	3	4-6	6-12	4	1	...
Total	65	25	40					

zation, and physiotherapy. X-rays were negative. Following one series of radon ointment the condition cleared up.

CASE 6. M. R., a 54-year-old female, fell, injuring the right wrist. X-rays were negative. An anterior splint was applied for three weeks. Two weeks later a typical case of Sudeck's atrophy developed. Radon ointment was administered in two series of six treatments each, with an interval of five weeks between the series. Pain, swelling, and limitation of movement disappeared in the order named.

CASE 7. M. H., 50, female, had marked osteoarthritis of the left hip of several years' duration. Various forms of physiotherapy were given without satisfactory results. The patient had six treatments of 25 cc. of radon ointment, 200 E.S.U. per cc., each time. Immediately following the first treatment the patient reported that the pain had diminished. While there was little improvement in limitation of movement, the patient had almost no pain after the last of six treatments, and reported, after three months and eight months, that she was still comfortable.

CASE 8. M. I., female, aged 56, had a frozen right shoulder, unusually painful and severely contracted. There was no history of accident. X-rays were negative. The condition persisted despite extensive novocain infiltration and physiotherapy. Application of radon ointment treatment relieved the pain immediately. While movement was not fully restored at the end of the series, the patient was entirely comfortable.

APPLICATION

The important thing to remember is that the ointment must be sealed onto the area treated by an airtight bandage. The procedure is simple but must be precise to be effective. The radon ointment may be obtained in tubes. The strength used in the cases here reported was 200 E.S.U. per cubic centimeter. The quantity depends upon the size of the skin area to be covered, varying from 5 cc. to 30 cc. for each treatment. A hip or shoulder requires the greatest amount, because of the larger surface.

The first step is to squeeze the ointment from the tube directly onto the skin and smooth it to a thickness of 1 mm. with a wooden spatula. Apply several layers of gauze cut to a size a little larger than the area of the ointment. Cover with a material such as oiled silk or cellophane and seal with adhesive tape. One must always keep in mind the necessity of an airtight bandage. Applications are made twice a week, and each bandage is kept on for 48 hours.

Besides producing physiological changes on the radiated area, alpha-ray therapy results in a hyperemia of therapeutic importance. It manifests itself in an erythema, appearing after every application and becoming darker and more pronounced as the use of radon ointment is continued. The patient should be prepared for the appearance of the erythema. Sometimes blister formations are observed. In this event the alpha-ray treatments should be interrupted and a reasonable period allowed to elapse before treatment is resumed. These blisters are extremely superficial and similar to those produced by light sunburn; they will disappear with the usual treatment.

DISCUSSION

After fifteen years' experience it is evident that rheumatoid arthritis and osteoarthritis can be well controlled and the patient kept symptom free if simultaneous, combined orthopedic, medical, and physiotherapeutic measures are administered under strict orthopedic supervision. Of course, much depends upon the stage at which the patient is first seen. In this combined, simultaneous method of treatment we found that radon ointment had an important place.

While there is every reason why arthritis should be treated primarily by an orthopedist, such an idea is not generally accepted. A medical specialist in arthritis should not be the one to decide when the optimum operative stage has been reached; nor should the orthopedist treat the patient merely in the surgical phase, but should also administer the necessary medical treatment for the condition.

Rheumatoid arthritis and so-called osteoarthritis are diseases that cannot be cured by a specific method or by one course of treatment. Patients with these diseases must have periodic medical supervision and control for a lifetime. Recurrences, as well as spontaneous remissions, are common.

To avoid discouragement, the physician should prepare the patient for possible recurrences or a less than complete recovery. The patient should be advised to return for periodic check-ups, for the lesion is at work and may progress. Only regular observation and several courses of treatment will give the patient, not a cure, but permanent relief.

To attain this state of permanent relief it is necessary to use one or more or a combination of the various remedies at our disposal. However, it is the experience of the author that few methods are as efficacious as radon ointment. It is not claimed that radon ointment is a cure for rheumatoid arthritis, osteoarthritis, or traumatic conditions. It is, however, a very helpful adjunct in giving the patient permanent relief and in speeding up the reinstitution of impaired functions following trauma or immobilization.

Some cases, it must be noted, require medical or orthopedic treatment, or both, in combination with radon ointment therapy.

CONCLUSIONS

1. Arthritis is primarily an orthopedic problem.

2. With this concept a more concentrated form of treatment can be applied, and the symptom complex can be better controlled by a unified surgical and medical approach.

3. While there is no age limit for the simultaneous, combined treatment and the use of alpha-ray therapy, they are particularly helpful to the physician interested in geriatrics.

4. Radon ointment was used in the simultaneous treatment of arthritis and in a series of traumatic conditions. In 65 cases treated with radon ointment therapy, results were satisfactory in all but two cases, and no deleterious effects were experienced. Especially notable are the simplicity of application and the quick response obtained with radon ointment therapy in rheumatoid arthritis, osteoarthritis, and posttraumatic and postimmobilization complaints and disabilities.

REFERENCES

COMROE, BERNARD I.: Arthritis and Allied Conditions. Philadelphia: Lea & Febiger, 1944. Pp. 755.

LUSTIG, FERDINAND: Radon and Physical Therapy. Med. Record, 158: 225-28 (April), 1945.

ADVANCES in chemotherapy and surgery are swelling the ranks of old age patients, and at no time in life is the need for the practice of the art of medicine so great as in old age. As senescence advances, man's underlying selfishness and pettiness rise to the surface and he becomes a burden to himself and those about him. The person who grows old gracefully is the exception. However, the growing problem of coping with the difficult aged individual will present little trouble to the doctor to whom the practice of the art of his profession is as natural as breathing.—E. E. KATTWINKEL, *New England Journal of Medicine*, 232: 724–27, 1945.

GERIATRICS

Official Journal of the American Geriatrics Society

EDITORIAL BOARD
A. E. HEDBACK, *Editor*

EDWARD B. ALLEN
HAVEN EMERSON
JONATHAN FORMAN
WINGATE M. JOHNSON
NORMAN JOLLIFFE
FOSTER KENNEDY
GEORGE W. KOSMAK
CHAUNCEY D. LEAKE
OSWALD SWINNEY LOWSLEY
J. A. MYERS
GEORGE E. PFAHLER
E. A. ROVENSTINE
MALFORD W. THEWLIS
E. L. TUOHY
WALTER E. VEST
MAURICE B. VISSCHER
S. MARX WHITE

FERTILITY, LONGEVITY, AND STAMINA

DARWIN observed that fertility throughout the whole animal kingdom is in direct proportion to the chances of death. This benevolent provision of nature, whether dependent on the principle of natural selection or survival of the fittest, insures the continuity of the species.

In this enlightened age, however, barriers have been built up against disease and danger; struggle does not enter into the scheme of existence as in the past, and we sit like cream puffs in the lap of luxury, satisfied with ease, comfort, and self-enjoyment. We accept artificial immunity as a matter of course, and consequently fail to build up resistance by contact and combat. In years gone by we developed immunity through environment, physical exertion, and cold baths. Now we avoid effort, have the tonsils out, and take a shot in the arm. Once upon a time a bucksaw and a cord of wood were considered good remedies for a cold, but now we must have pretty pills and more shots to supply an attenuated specimen with the resistance that it cannot itself engender.

We boast about increased longevity in the human race—but to what end or purpose? Life should not be measured by a mere span of languid years. It should be rated on the basis of useful accomplishments. If we cannot combine the benefits of scientific discoveries with the advantages that accrue from a strenuous life beset with dangerous adventure, then we must choose, for our goal, between dull senility and a shorter but more vigorous and interesting existence. We should be able to combine these benefits, however, if we lay more

stress on building stamina. The armed forces did a good job of it, and civilians can profit by their example. Let us have longevity by all means, but with health and strength in abundance.

A. E. H.

OUT OF THIS NETTLE, DANGER

Out of the suffering wrought by the war there have emerged a few benefits, both tangible and intangible, which, if mankind can be prevented from destroying itself, may remain to bless succeeding generations. Not the least of these possible goods is an improvement in the status of older people in industry, business, and the professions. When the war drained the country of its most vigorous young men, the need for workmen, both skilled and unskilled, became so acute that many thousands of persons past the retirement age were retained in their jobs or were brought back into industry, business, and the professions. That the older men and women could hold their own was shown by the magnificent record of the American home front.

As the proportion of older people in our population steadily mounts, this proof that the average workman has many more years of usefulness than have generally been allotted to him should be of particular interest to both doctors and economists. It is a fact well known to psychiatrists that older people are far more contented and are likely to live longer if they are gainfully employed as long as they are able to work. Certainly it will make for a healthier and happier society to keep the older members of the population at work longer.

It was becoming obvious before the war that failure to provide some means of supporting the older people in our country or to allow them to support themselves would eventually mean saddling the younger half of the population with a veritable Old Man of the Sea whose weight would become crushing. Even when unemployment was at its peak, during the depression, farsighted statisticians foresaw that the policy of regarding a workman past 40 as too old to hire, and of retiring, willy-nilly, those past 60, would ultimately bring about an intolerable situation.

Now that we have succeeded once again in saving democracy, let us hope that the lessons learned at such dear cost will be applied to make our democratic society a healthier, wealthier, and wiser one.

W. M. J.

THIRD ANNUAL MEETING, AMERICAN GERIATRICS SOCIETY, NEW YORK, JUNE 13-15, 1946

As announced in the January issue of geriatrics, the third annual meeting of the American Geriatrics Society will be held at the Hotel Commodore, New York City, June 13-15, 1946.

Fellows and associates of the Society are advised to engage accommodations at once, in view of the crowded condition of New York hotels. They are urged also to register in advance. There will be no charge for registration.

Papers will be limited to fifteen minutes each. Each author is requested to arrange for one discussant. Discussions will be limited to five minutes each. Typescripts of papers and discussions and an abstract of each paper (limited to one page, double spaced) must be in the hands of Dr. Edward B. Allen, Chairman of the Program Committee, 121 Westchester Avenue, White Plains, New York, by May 1.

GERIATRICS, Official Journal of the Society, will publish all papers as far as space permits.

COMMENTS ON OUR FIRST ISSUE

As Volume I, No. 2 of GERIATRICS goes to press it is still too early to gauge the wider response to the new journal. However, a number of congratulatory letters have come to the editors and publishers, and we share excerpts from some of them with our readers.

"I want to congratulate you upon the first issue of your new magazine *Geriatrics*.

"I feel that this magazine will fill a real need in the medical profession and above all things make the medical profession conscious of the problems associated with geriatrics.

"Surely we can thank much of our increase in longevity to the fact that pediatrics was made very popular in the '20s and '30s, and I am delighted to know that there is a magazine that is going to make the study of geriatrics more important. In due time I hope that all the various universities will have a department of geriatrics, and it is my assumption that those departments are going to be as important in the future as departments of pediatrics have been in the past.

"My congratulations!"—KARL W. ANDERSON, M.D., Northwestern National Life Insurance Company.

"From weddings to wakes, there is nothing more joyous than births. Congratulations on the birth of the new journal, *Geriatrics*, which arrived at my home desk today. May its shadow grow bigger and bigger.

"Glad to see such medical milestones mentioned as Nascher, Clendening, and Peters, by Thewlis, Forman, and Myers."—JOHN W. SHUMAN, Lt. Col. M.C., Santa Monica, California.

"I wish to compliment those responsible for the new journal. I think it is very excellent in every respect."—F. L. PHILIP KOCH, M.D., New York.

"Congratulations on the first issue of *Geriatrics*. The format is particularly pleasing. The whole layout is fine, and I am glad that you are giving a note about the authors at the bottom of the first page of the article."—CHAUNCEY D. LEAKE, University of Texas, Medical Branch.

"I think that this new periodical fills a need and I like this first issue very much."—RUDOLF SCHINDLER, M.D., Los Angeles, California.

"I am sure many of Dr. Palmer's former colleagues will be most interested in the journal for it fills a much needed place in medical literature, affording, as it does, a means of collecting and disseminating the results of new work in this expanding field of medicine. The journal, as represented by the first issue, contains material of highest professional excellence."—SALLIE T. PHILIPS, Kennett Square, Pennsylvania, secretary to the late Dr. Harold D. Palmer.

"It might interest you to learn that we have here in Buenos Aires a Council for the Study of the Aging (Junto Argentina para el Estudio del Envejecer), presided over by our eminent physiologist Prof. Dr. B. A. Houssay. The interest in these questions is increasing also in South America."—PABLO OSVALDO WOLFF, M.D., Ph.D., Buenos Aires, Argentine.

"I am pleased to be enrolled as a charter subscriber to *Geriatrics*. The excellent articles in the first issue are worth more than the year's subscription. I wish you success."—WARREN THOMPSON, M.D., Omaha, Nebraska.

"I am delighted with the first issue of *Geriatrics*. The format is excellent, and I think that the articles and editorials are also good. . . . So far I have only commendation."—WINGATE M. JOHNSON, M.D., Winston-Salem, North Carolina.

"At last it is here; for a long time we have been predicting that one of these days there would be a magazine devoted to geriatrics. Modern Medicine Publications of Minneapolis announces that a bimonthly publication bearing that name will be published as of January 1."—*Journal of the Indiana State Medical Association,* December 1945.

"I received the first issue of *Geriatrics* and am very much pleased with it. I have felt for some time the need of more authoritative literature on the subject."—LAURA S. HEBEL, Hebel Home for Convalescents, Poynette, Wisconsin.

"Volume I, No. 1 of *Geriatrics* has just been received. My hearty congratulations! . . . It certainly looks most interesting and is very well gotten up. It is mighty fine that the great objective of having an organ for the American Geriatrics Society is now a reality."—WILLIAM SEAMAN BAINBRIDGE, M.D., New York.

"I have just received a copy of the first issue of *Geriatrics* and want to congratulate you on its contents and appearance. I believe the new journal will meet with a good reception and you have my best wishes for its continued success."—GEORGE W. KOSMAK, M.D., New York, Editor, *American Journal of Obstetrics and Gynecology.*

"I have received my copy of *Geriatrics,* which I consider a very fine magazine which will fill a long-felt want. I predict for it a long and successful career."—THEODORE G. KLUMPP, M.D., New York.

Digests FROM CURRENT LITERATURE

Relativity in Age and Health.
E. J. STIEGLITZ. *New York Med.*, 1 (July 20, 1945), 19-22.

Relativity in age and health is discussed. There are important distinctions between *chronologic* and *biologic* age. The senescent individual is particularly vulnerable to "degenerative" disorders, of which the frequency rises in the fifth decade. Life expectancy in the United States was 47 years in 1900, 60 years in 1930, and 63 years in 1940.

Subtle biochemical changes forming part of the normal fluctuations of living may be precursors to slow, progressive depreciations of health. Particularly important are the depreciations in effectiveness of certain homeostatic mechanisms.

The essence of clinical evaluation of health is application of functional tests. Observing the response to conditions of functional stress is the only way of detecting and measuring early depreciations in reserve.

The therapy of *constructive* medicine is more important than that of *preventive* medicine.

The Diagnosis and Treatment of Coronary Sclerosis.
A. R. BARNES. *Proc. Interst. Post-Grad. M. A. North America* (1944-45), 275-79, 1945.

The prime fact about anginal pain is that it is produced by exertion and walking, particularly soon after eating. If cardiac pain in the thorax is associated with outbreak of perspiration, it indicates severe insufficiency of coronary circulation. The duration of pain through insufficiency of the coronary arteries is three to ten minutes. Substernal pain lasting thirty minutes suggests that coronary occlusion is its basis, or another cause than coronary sclerosis.

Too much dependence is placed on electrocardiograms in the recognition of coronary sclerosis. Levy's criteria are discussed, indicating positive results of his test, during which the fasting subject breathes air containing 10 per cent oxygen for fifteen minutes.

The proper approach to the treatment of coronary sclerosis is that the physician have a clear appreciation of both the adaptations that coronary circulation could make to its impairment and the limitations of any method of treatment. The modern concept is that coronary arteries are not end arteries. Abundant evidence demonstrates that in hearts showing disease of the coronary arteries there is a collateral circulation between the right and left coronary arteries. The extent of functional impairment of the heart imposed by coronary sclerosis is conditioned by the load the heart carries and by cardiac hypertrophy produced by other pathologic conditions.

By injection studies it has been shown that effective anastomotic circulation develops whenever needed; it occurs as a result of partial or complete closure of a coronary vessel, and this circulatory adjustment is localized to the region where it is needed.

Therefore, the patient's survival depends on the speed of development of anastomotic circulation.

The keystone for treatment of anginal pain is restriction of effort to that point where pain is not produced. Glyceryl trinitrate should be used liberally to alleviate anginal pain. It may even be administered to forestall occurrence of pain following a meal. Sedative drugs must be employed to secure the desired relaxation. Nicotine, which has a constricting effect on vessels, is to be avoided. In persistent attacks, aminophylline should be given in doses of 3¾ to 7½ grains once to three times daily. Sometimes morphine is indicated. When in bed the patient should shift position frequently and breathe deeply. Heparin, dicoumarol, atropine, and papaverine have been employed successfully. In cases of frequent extrasystoles, quinidine sulfate is administered in doses of 3 grains three times daily.

Vertigo and Daze in the Aged. (Les vertiges et éblouissements des vieillards.)

E. A. *J. de méd. de Bordeaux,* 121 : 9 (Jan. 15-30), 1944.

The symptoms of vertigo, daze, and glare, of which old people frequently complain, are discussed. The attacks are spontaneous. They occur nearly always when the person is in an upright position, either after a sudden change of posture or (especially in the case of dizziness) after getting up from bed rather abruptly, or suddenly lifting the upper portion of the trunk after it has been bent over; also in movements of rotation, or when the head is raised quickly.

Riser, Planques, and Seigneuric hold that vertigo is the result of effort and exertion in walking, which may provoke an actual intermittent cerebral claudication.

The characteristic symptoms are instability through decreasing acuity of perception (vision becomes blurred; hearing diminishes), or through temporary interruption of ideation and a certain degree of absentmindedness, all of which represents a more or less pronounced eclipse of psychic activity. The blood pressure is either elevated or, more frequently, below normal. The individual has the feeling of marked cardiac insufficiency and of sinusal hyperexcitability, revealed through the presence of palpitation in the carotid region; the tension in the retinal arteries shows pronounced decrease.

Hyperexcitability in the aged is evidently a consequence of arteriosclerosis, but it may also be due to denutrition, anemia, or myxedema. It discloses the lability of the general cardiac and vasomotor tonus in old people, whose frequent sensations of chill, syndromes of asphyxia, and extremital syncopes are typical manifestations.

The treatment consists of improvement of the associated pathological conditions. An extremely restrictive regimen is not advisable in the aged, except in cases of very high blood pressure. If the pressure is low, strophanthus and extracts of kola and coca are recommended. Digitalis should be avoided in such cases because of its depressive effect on the sinus. Gardenal, bromural, and atropine are used in treating vegetative sympathetic nerve disturbances in old people.

The Aging Heart.

R. S. Berghoff. *Proc. Interst. Post-Grad. M. A. North America* (1944-45), 154-58, 1945.

Arteriosclerotic or senile heart disease accounted for 31 per cent of the

500 patients studied. Of these, myocardial involvement predominated, with 18 per cent; those with coronary symptoms furnished 13 per cent. Hypertensive heart disease ranked next, with 28.2 per cent. Syphilitic heart disease accounted for 20.2 per cent (including many colored patients, hence the high percentage). Other proportions were as follows: rheumatic heart disease, 12.5 per cent (10.5 per cent of the mitral type; 2.0 per cent of the aortic type); thyroid heart disease, 2.5 per cent; cardiovascular renal disease, 1.6 per cent. The remaining 3.2 per cent showed no organic heart disease.

These data prove that the arteriosclerotic type of heart disease outranks all others in persons from 50 to 80 years of age. The treatment of senile heart muscle insufficiency resolves itself around heart muscle rest and active heart muscle support. Active heart muscle support means, of course, digitalis, which has prophylactic and actual value as heart muscle support; its long continued use builds up senile hearts. Coronary artery disease is part of the process of senility. The greater part of coronary disease is due to arteriosclerosis, or more specifically, atherosclerosis.

The prognosis of status anginosus varies with the degree of generalized sclerosis and atheromatosis. Management concerns itself largely with maintaining the patient within his energy potentials through rest and coronary dilators. Most persons with angina pectoris have sustained previous occlusions. Angina pectoris is progressive and frequently culminates in chronic coronary insufficiency. The pain is due to coronary insufficiency and a resultant myocardial ischemia. The first segment of the left coronary is mostly involved in early life, because it turns at almost a right angle. More sudden deaths are due to left coronary lesions than to right.

The patient with myocardial necrosis due to acute closure of a coronary vessel needs immediate and adequate rest, up to two or more months. His return to physical activity should be gradual. The diet should be bland, soft, digestible, and small in quantity, with frequent feedings. In the presence of dyspnea, oxygen (tent, mask, or catheter), is required.

Coronary dilators (intravenously or by mouth) can safely be started early in the course of treatment. Sedation is of utmost importance. It may call for opiates and shade off into the barbiturates.

Arteriosclerosis and Hypertension. (Arterioesclerosis é hipertensión.) F. CIVEIRA. *Día méd.*, 17, No. 29: 730-34 (July 16), 1945.

Abnormally high blood pressure causes arteriosclerosis, and vice versa. The large and medium arteries, excessively distended in consequence of high blood pressure, have to stand the differential tension permanently, surpassing the physiological limits. These arteries are reduced to conditions of mechanical effects likely to produce an increase in the thickness of the elastic muscular tunica interna in the initial stage of development. An exact parallel appears to exist between the duration and extent of hypertension and the degree reached through hypertrophy.

Muscular hypertrophy is compensatory, carrying in itself inevitable doom, since irrigation does not increase with the quantity of hypertrophic cells, and consequently a second degenerative stage, forming part of the development of arteriosclerosis, is inevitable.

From the point of view of etiologic

pathogenesis, therefore, a relationship exists between essentially independent processes. Although there seems to be no direct relation between hypercholesterinemia and arteriosclerosis, this does not signify that a general change in the lipid metabolism is not evidenced by variations in the cholesterine level and does not play the principal role in the production of atheroma blood platelets.

In certain cases initial development of hyalin or mucous degeneration is observed, gradually leading to more advanced stages. Reversible forms may become irreversible through angiomalacia, which, with the dilatation of the vascular lumen, may result in senile ectasia, characteristic of old age.

In arteriosclerosis, which is of decidedly physiological origin, a distinction is made between hyperplastic processes (multiplication of the elastic connective tissue of the intima, and, in certain cases, the media), and degenerative processes (mucous, fatty, calcareous, and hyalin degeneration, the last mentioned of the arterioles).

The Malignant Phase of Hypertension.

M. RACHMILEWITZ and A. DE VRIES. *Acta med. orient.*, 4:295 - 302 (Sept.), 1945.

Malignant hypertension is a definite clinical entity, with antecedent benign essential hypertension. The characteristics are elevated arterial pressure (diastolic above 130) and neuroretinopathy and evidence of functional impairment of vital organs (heart, brain, and kidneys). At the onset the patients complain of headache, fatigue, loss in weight, and visual disturbances. The clinical picture is determined by the organ mainly damaged by morbid vascular changes. In the early stages there is normal or moderately reduced renal efficiency. Uremia develops in the final stages. In this disease the concomitant failure of two or more organs leads to death.

The differential diagnosis between malignant hypertension and chronic glomerulonephritis is rather difficult. This fact is of prognostic significance. Blood pressure in glomerulonephritis is less elevated and ocular changes are less pronounced than in malignant hypertension. There is always impairment of renal function, but there is no papilledema. Anemia is very marked, while cardiac involvement is not typical for glomerulonephritis. In both diseases the effective renal blood flow, glomerular filtration rate, and maximum tubular secretory capacity for diodrast are markedly diminished.

The principal points in which the diseases differ are as follows: In malignant hypertension the filtration fraction is increased above normal; the rate of effective renal blood flow per unit of functional tubular mass is lowered, showing that renal ischemia exists; and there is no evidence of focal tubular saturation. In glomerulonephritis the filtration fraction and the rate of effective renal blood flow per unit of functional tubular mass are normal; there is no ischemia, and focal tubular saturation is observed in a number of cases.

It is highly suggestive that hypertension is the decisive factor in producing this unique clinical picture and its pathology. The role of hypertension is illustrated by exceptional cases like those of pheochromocytoma with paroxysmal rises of the blood pressure, where reversal of the clinical signs is observed after relieving the hypertension. The clinical experience conforms to Byrom's and Wilson's

view that the "determining factor is probably a sudden strain imposed on the vessel wall by the combination of severe vasoconstriction and the resultant rapid rise in blood pressure."

Bibliography of 33 references.

The Pathogenesis of Hypertension.
R. M. BREMNER. *Univ. Toronto M.J.*, 1945-46, 23:33-41 (Oct.), 1945.

Arterial pressure depends upon the interrelations of (1) the minute volume of the heart (the cardiac output per minute); (2) elasticity of the heart walls, particularly the central arteries; (3) peripheral resistance (the caliber or cross-section area of the vascular bed, chiefly the arterioles, partly the capillaries); (4) blood volume; and (5) blood viscosity.

The disorders in which systolic blood pressure may be elevated with normal diastolic pressure are aortic insufficiency, complete heart block, hyperthyroidism, and arteriosclerosis of the large arteries. Diastolic hypertension is nearly always associated with secondary systolic hypertension. Elevation of systolic blood pressure alone has little clinical significance.

Increased arterial blood pressure occurs in the following disease processes: asphyxia, increased intercranial pressure, endocrine disorders, kidney disease, primary or essential hypertension (hyperpiesia), specific hypertensive disease in toxemia, and coarctation of the aorta.

With regard to arterial hypertension through the blood volume or blood viscosity (the latter is considered an integral part of the peripheral resistance), there is only one clinical entity in which the alteration may be of such proportions as significantly to increase blood pressure, that is in polycythemia vera, in which both the volume of the blood and its viscosity are greatly augmented. The blood pressure is frequently, but not always, raised. In those cases in which hypertension is found, it may be due to an associated hyperpiesia.

The great majority of all hypertensive patients have essential hypertension. The existence of a definite hereditary tendency has been established. The condition usually develops after the fourth decade of life. Certain clinical findings are indicative of a prehypertensive state. In this state there is lability of blood pressure, indicated by temporary elevations in otherwise normal individuals, in response to a standardized stimulus—the immersion of the hand in ice water.

Peripheral vasoconstriction in essential hypertension may be due to endocrine influences or nervous influences, such as exaggeration of the usual vasomotor response, caused by inherent hypersensitivity of the vasoconstrictor nerves; or to generalized vasoconstriction, due to interference with circulation in the medullary centers, as a result of local vascular disease; or to renal ischemia. However, renal ischemia does not seem to be the primary etiological agent in hyperpiesia; for the renal ischemia observed in hypertensive patients appears to be a result of the hypertensive process.

Bibliography of 15 references.

Observations on the Pathogenesis of Hypertension.
N. N. GOREV and A. I. SMIRNOVA-ZAMKOVA. *Am. Rev. Soviet Med.*, 3:28-34, 1945.

The reflexogenic form of experimental hypertension is especially convenient for the study of progressive morphologic changes; the condition is produced by sectioning the presso-re-

ceptor nerves of the carotid sinus and the aortic arch unilaterally, twelve to fourteen days later on the opposite side. Average systolic pressure of rabbits three months postoperatively is 130 to 136 mm. as compared with a preoperative pressure of 105 to 115 mm. Tachycardia reaches 300 beats or more per minute, and an increase in the diameter of the heart may be observed. Myocardial fibers become hypertrophied, the intima of vessels becomes hyperplastic and hyalinized, and the elastic interna disintegrates. The vasoconstrictor action of sera from hypertensive rabbits is double that of control animals. In dogs section of the presso-receptors produces even greater degrees of hypertension.

After an extensive study of the successive steps in the hypertensive process, N. N. Gorev and A. I. Smirnova-Zamkova have concluded that the filtering membrane (basic argyrophil substance representing the noncellular part of the hematoparenchymal barrier) may be an important pathogenetic factor in the disease.

The formative function and systemic distribution of this silver-staining substance indicate a close relationship to embryonic development of the entire organism rather than to separate cellular structures. The entire argyrophil system may be affected by conditions such as toxemia, in which the substance changes to the sol state, and arterial hypertension, which produces the gel state.

Functional changes in the cells of connective tissue are associated with biophysical, biochemical and morphologic variations in the filtering membranes and may explain cellular death. In experimental hypertension the filtering capacity of the vascular wall, and consequently the nutrition of the surrounding tissues, is impaired by the hardening and thickening of the argyrophil substance. Tissue attrition is eventually followed by parenchymal degeneration. Contiguous cellular connective tissue becomes hyperplastic.

The chemical instability of the argyrophil substance explains the progressive changes of hypertension from the early labile phases to the final irreversible fibrotic stage. The initial hardening and thickening of the filtering membranes is followed by the sol, or softening stage, which usually takes place during the sixth postoperative month. During the softening stage the substance undergoes a transformation leading to the final, irreversible fibrotic stage.

In the final stage of hypertension, foci of fibrosis may be found in various organs, particularly the heart and kidneys, and the silver-staining colloidal substance may be identified as the common pathogenetic factor.

The Aetiology of Essential Hypertension.

M. F. Locket. *Post-Grad. M.J.* (London), 21:287-98 (Oct.), 1945.

The subjects discussed are experimental hypertension and the methods used in the production of essential hypertension; moderator nerve and carotid sinus hypertension; cerebral anemia, partial nephrectomy, and renal insufficiency; renal ischemia; renal pressor compounds (renin activator, angiotonin inhibitor); hypertensinase; and the pressor bases of urine.

It has been shown that the blood pressure is raised in each case of essential hypertension in man and of experimental hypertension due to renal ischemia in animals by a chemical agent. This finding would indicate the importance of renal ischemia in the

etiology of essential hypertension, but it does suggest that the actual causative agent in the disease in man is that which produces renal ischemia. Although evidence of unilateral or bilateral constriction of the renal arteries was found in a number of cases, in the great majority such evidence is lacking, and the changes are those of bilateral, symmetrical arteriolarsclerosis. The first stage of renal arteriolar constriction is attended by an increased glomerular pressure and constriction of the efferent arterioles.

The presence of a new, important blood pressure controlling mechanism, the renin system, has been detected. Renin, an enzyme of the kidney cortex, acts on a blood globulin, hypertensinogen, to form a pressor compound, hypertensin. Renin is liberated in ischemia kidneys and occurs in the blood of patients with essential hypertension and in animals with experimental hypertension. It is assumed that renin liberation by ischemia kidneys is responsible for production of persistent high blood pressure. From studies on the species specificity and antigenic nature of renin came the hope, as yet unfulfilled, of the effectiveness of renin as an antihypertensive agent. It is possible that this compound when isolated may prove therapeutically effective.

The use of thiocyanate in the treatment of hypertension is reviewed. A report of pharmacological actions of sulfocyanates has recently been published. For efficacious therapy and avoidance of toxic symptoms, control determinations of the blood thiocyanates are necessary. A level of 12.5 mg./100 cc. is regarded as therapeutic, but at this blood concentration toxic manifestations may occur in patients having no great sensitivity to the drug. Venous thrombosis attributed to thiocyanates occurred with blood levels of 4.2 mg. and 6.5 mg./100 cc. Sympathectomy increases sensitivity to thiocyanates. Despite the dangers attendant on its use, patients are effectively treated with this drug.

Bibliography of 241 references.

The Pathology of Coronary Artery Sclerosis and Thrombosis.

B. Earl Clarke. *Rhode Island M.J.*, 28:791-92 (Nov.), 1945.

Acute occlusion of a coronary artery is nearly always superimposed upon preexisting arteriosclerosis. One theory of thrombus formation is that at the lumen of a coronary artery, distorted by an arteriosclerotic process with a resulting deformity, a pool is formed within which the blood eddies, becomes stagnant, and finally clots. Anything that lowers the blood pressure and slows the blood stream may hasten the clotting. Circulatory failure, shock, infection, and bed rest are thus predisposing causes. Dehydration and increased blood viscosity may also be factors.

A second theory proposes rupture or ulceration of an atheromatous plaque. This condition may result in occlusion by more than one mechanism. (1) The roof of the plaque may be loosened at the downstream end and flap up against the opposite wall, occluding the lumen. A thrombus then forms behind the obstruction. (2) The roof of the plaque may be ruptured and its atheromatous content be discharged as an embolus that lodges in the narrowed lumen upstream. A thrombus may then form behind it. (3) A thrombus may form on the roughened surface of the atheromatous ulcer.

Capillary vessels are often present within the thickened intima of sclerot-

ic vessels. Sometimes they occur deeply and are presumed to come from the vasa vasorum of the adventitia; when superficial, they are believed to come directly from the endothelial lining of the vessel. At times they are found to communicate directly with the lumen of the artery and are subject to sudden increase of blood pressure. They may be formed in response to the atheromatous lesion, as an attempt at repair.

Since the capillaries are surrounded by soft, atheromatous material, they are easily injured or ruptured, with resultant hemorrhage, which in turn may lead to occlusion. (1) The hemorrhage may be so large that it swells the atheromatous plaque until the lumen is obliterated, in which case no thrombus is needed. (2) The hemorrhage may not enlarge the plaque but extend to its endothelial surface, causing injury or even rupture, and a thrombus is formed on the injured surface. (3) The hemorrhage may initiate thrombus formation within a capillary, with propagation along the capillary to its orifice on the endothelial surface, where it forms the starting point for a thrombus that occludes the coronary lumen.

Arterial Thickening in Old Age.

T. H. Howell. *Brit. Heart J.*, 7:135-38 (July), 1945.

The arteries of 341 Chelsea pensioners were examined. The pensioners were classified into five groups, each with distinct characters and successive stages of sclerotic change: (1) no obvious arterial thickening; (2) slight thickening; (3) moderate thickening, with arteries easily palpable; (4) thickening of all arteries examined, with tortuosity in some, accompanied by slight or patchy calcification of the radials; (5) marked calcification present.

No cases were found to proceed from harder to softer arteries. The first group was composed of 53 men whose ages ranged from 66 to 84. Many of the older members did not look nearly their age, nor did they behave in senile fashion. Regarding blood pressure, 79 per cent of the pensioners had systolic readings over 160. In group 3 it rose to 80 per cent, in group 4 to 84 per cent, and in group 5 to 96 per cent. The percentage of men who had systolic pressure over 200 mm. was 24.6. The diastolic pressure varied from 100 mm. to 140 mm.; in only a comparatively small number was it over 120 mm. The percentage of men with a systolic figure over 200 mm. rises with age.

An improved method of clinical examination of arteries is described. It was found that, as a minimum, examination of both radials and brachials was necessary.

The process of rubbing the fingers up and down the course of the arteries gave satisfactory information about their condition that was not elicited in any other way. 4 tables.

Malignant Hypertension Cured by Unilateral Nephrectomy.

C. B. Perry. *Brit. Heart J.*, 3:139-42 (July), 1945.

The commonest cause of unilateral renal disease producing hypertension seems to be chronic atrophic pyelonephritis, with apparent obstruction to the renal arteries, which probably is the cause of the renal ischemia.

Removal of the offending kidney has not always resulted in cure of hypertension, and in certain cases in which the immediate effects of an operation were gratifying the blood pressure later

returned to the same level as before.

According to Schroeder and Fish the criteria for renal operation are as follows: (1) The onset of hypertension should be recent. (2) The renal lesion should be confined to one kidney and should be such that there is diminution of function in that kidney. (3) Renal function should be within normal limits. (4) Retinitis should be absent. (5) The arterial pressure should be persistently elevated.

However, certain authors hold that presence of papilledema and retinitis (malignant hypertension) are not contraindications to nephrectomy.

Cases are described that apparently show complete cure of malignant hypertension following unilateral nephrectomy. Successful results of nephrectomy have been reported also in renal tuberculosis, tumor, following trauma, and in atherosclerosis of the renal artery. 2 figures; bibliography of 16 references.

A Critique of Psychotherapy in Arterial Hypertension.

C. BINGER. *Bull. New York Acad. Med.*, 21:610-15 (Nov.), 1945.

It is unknown whether impulses giving rise to arteriolar constriction are of humoral or neural origin, or both. It is also not known what part the kidney and renal circulation play in bringing it about. In defining the disease it can only be stated that elevation of the systolic and diastolic blood pressures, either fluctuating or constant, occurs in association with arteriolar vasoconstriction.

In considering the complicated subject of arterial hypertension it is appropriate also to review experiences with psychotherapy, the aim of which is to treat the person, not the vasoconstrictor mechanism. There is evidence that a correlation exists between levels of blood pressure and emotional disturbance, and also that suitable psychotherapy can ameliorate some of the symptoms, such as headache, fatigue, palpitation, vertigo, shortness of breath, and the fear these symptoms engender.

Patients of this type require protection from emotional strain, especially from demands upon self-reliance which they do not possess. They also need maximum reassurance about the disease itself. They require to be weaned away from overconcern with the level of their blood pressure. The experienced physician will vary his methods accordingly. The manner in which the frightening fact of high blood pressure is first presented is of the utmost significance.

Drugs and sedatives, rest and exercise, diet and baths, all have psychotherapeutic implications. The surgical amphitheatre has become the last resort in this illness. However, there are patients who would face it as a deliverance and who respond to sympathectomy with reduction of blood pressure and recession of retinitis; others face operation as they would doom. Bibliography of 11 references.

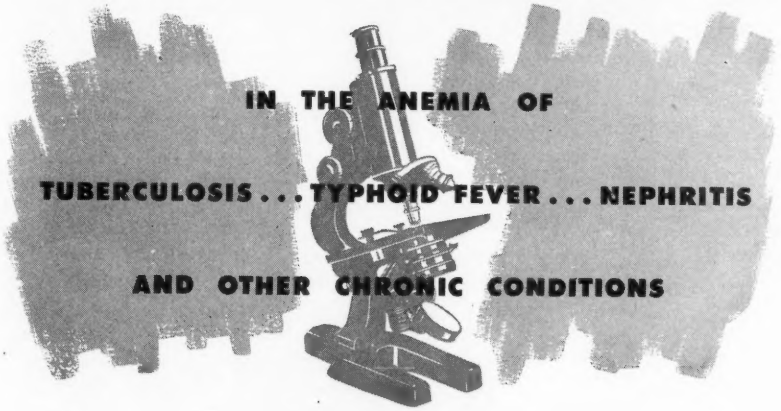
PROSTATE

The Glandular Nodule in Benign Glandular Enlargement of the Prostate.

D. MACLEOD. *Brit. J. Urol.*, 17:85-101, 1945.

The evidence of the sequence of events leading to the development of the glandular nodule in benign glandular enlargement of the prostate is as follows: At any time during the growth of the prostate there are present groups of tubules arising from the terminations of its primary and sub-

Number 4 of a Series



HEPATINIC

Two factors function in chronic infections to produce the usually concomitant hypochromic anemia—

(a) increased destruction or increased utilization of red cells due to the infection;

(b) impaired intake or utilization of diet.

Consequently one phase of medical management of chronic infections includes eradication of the coexisting anemia. Hepatinic presents iron in preferred form, together with crude (unfractionated) liver concentrate, enhanced by the addition of the B complex. The crude (unfractionated) liver concentrate is subjected in manufacture to a special process of "enzymatic digestion", assuring maximum assimilation.

Taste Appeal!

Taste is important in hemopoietic tonics. Hepatinic—pleasantly palatable—is readily accepted even by finicky, taste-conscious patients. Samples will be sent to physicians on request.

FORMULA:

Each fluidounce contains: Ferrous Sulfate 12 gr., Crude Liver Concentrate (equivalent to 660 gr. fresh liver) 60 gr., fortified to represent Thiamine Hydrochloride 2 mg., Riboflavin 4 mg., Niacinamide 20 mg., together with pyridoxine, pantothenic acid, choline, folic acid, vitamin B_{10}, vitamin B_{11}, biotin, inositol, para-amino-benzoic acid and other factors of the vitamin B complex.

Elixir Hepatinic is supplied in bottles of one pint and one gallon

McNeil Laboratories
INCORPORATED
PHILADELPHIA • PENNSYLVANIA

sidiary tubules; they may be collective, as in the prespermatic region, or individual.

With further increase of the glandular tissue a circumscribed resistance is caused indirectly by a passive force applied to those tissues from the periphery of the prostate and from that of the prespermatic region. Growth of the groups against the resisting tissue is accompanied by the formation of circumscribed capsules of fibrous or compressed glandular tissue about them; the groups are thus isolated and form the glandular nodules associated with benign enlargement of the prostate. Within the limiting capsules growth of the groups may continue. Acinous formation and intra-acinous epithelial proliferation are followed by acinous dilatation and rupture.

The direct cause of prostatic benign glandular enlargement is therefore continuity of active glandular growth against a passive and circumscribed resistance derived from the periphery of the prostate and the prespermatic region. The glandular nodule in the benign enlarged prostate is evidence of an attempt to limit the size of the gland.

Peripheral resistance to the glandular growth becomes effective in the upper parts of the prostate first and in the lower parts last, because of disproportionate increase of growth in the two regions, and glandular nodules are formed in the same order. The absence of benign enlargement from the upper part of the posterior lobe of the prostate is due to destruction of its groups of tubules by pressure from the enlarging lobes in front of it; absence from the lower part is caused by lack of adequate peripheral resistance to its growing groups of tubules.

Benign glandular enlargement of the terminal parts of the lateral prostatic lobes is as rare as that of the posterior lobe. It is due to lack of adequate peripheral resistance to the growth of the tubules in those parts.

10 figures. Bibliography of 15 references.

Bladder-Neck Obstruction Due to Non-Malignant Disease of the Prostate.

H. HAMILTON STEWART. *Brit. M. J.*, 2:724-27 (Nov. 24), 1945.

Good results are obtained by radical treatment of prostatic obstruction. Early intervention is advised. The perurethral operation is considered the method of choice. The present paper is based upon a series of 875 consecutive cases, of which 752 were submitted to radical operation, i.e., 82.6 per cent were treated by the urethral method. The mortality rate, including coexisting lesions in other systems, was 3.4 per cent. However, Harris's one-stage and two-stage prostatectomy are the safest operations, in view of the fact that no deaths occurred.

The author suggests the following methods for the detection of silent obstructions: (1) Left lateral, with examination of the rectum and prostate: one should observe if the upper notch can be palpated and determine the size of the apices of the lobes. (2) Knee-chest position: the seminal vesicles are palpated and any perivesicular infiltration noted, whether neoplastic or fibrotic. (3) Supine: bimanual examination through the rectum is made. By this method the amount of residual urine can be assessed fairly accurately. The position of the upper limit of the bladder may be detected by *"ballottement"*, the impulse being transmitted to the rectal finger on the prostate.

Presence of pus in the urine, whether

Multiple Vitamin Supplementation

LOGICAL, ECONOMICAL PRODUCT FOR A LOGICAL NEED

EACH CAPSULE CONTAINS:	
Vitamin A	5000 U.S.P. units
Vitamin D	800 U.S.P. units
Thiamine Hydrochloride, U.S.P.	3 mg.
Riboflavin	3 mg.
Ascorbic Acid, U.S.P.	75 mg.
Nicotinamide	20 mg.
Pyridoxine Hydrochloride	0.5 mg.
Calcium Pantothenate	5 mg.
Mixed Tocopherols biologically equivalent to 3 mg. Alpha Tocopherol.	

In those conditions for which multiple vitamin supplementation is rationally indicated,†

White's

NEO MULTI-VI CAPSULES

offer a preparation formulated upon a sound therapeutic basis—realistic efficiency—practical usefulness—and *economy* to the patient.

The well-balanced formula contains nine vitamins—including all clinically established vitamins in amounts safely above adult basic daily requirements,* yet not wastefully in excess of average patient's needs.

Small, easy-to-take capsules. Price to the patient is also small for comparable vitamin potency. The White name is assurance of stability and uniformity.

†Indications: Routine prophylaxis against dietary deficiencies—increased metabolic rate—thyroid dysfunction; suspected border-line multiple deficiencies; suboptimal nutrition—restricted diets—the aged—wasting disease—pre- and post-operatively—in convalescence—pregnancy—lactation.

Bottles of 25, 100, 500 and 1000 capsules.

*Promulgated in regulations of Food and Drug Administration, 1941

ETHICALLY PROMOTED—
NOT ADVERTISED TO THE LAITY

WHITE LABORATORIES, INC.

Pharmaceutical Manufacturers,
Newark 7, N. J.

sterile or not, should always arouse suspicion. A straight radiograph of the urinary tract should be taken in all cases. Intravenous urograms should be taken in certain groups. Intravenous pyelograms may also give an indication of the function of each kidney and any dilatation of the upper urinary tract.

Perurethral prostatectomy usually results in as complete a removal as suprapubic enucleation. The prospect of recurrence is remote. Resection of prostatic tissue, to leave a channel through which urine may pass, should be the aim only in malignant cases.

3 tables.

Sarcoma of the Prostate: A Report of One Case of Rhabdomyosarcoma of the Prostate.

A. E. RAPPOPORT and C. E. NIXON. *Am. J. Clin. Path.,* 15:456-66 (Oct.), 1945.

Few tumors are more devastating, possess so dismal a prognosis, or are so unamenable to treatment as sarcoma of the prostate. However, between 1929 and 1941 only one case was found in 14,400 consecutive autopsies at Cook County Hospital.

Histogenetically, more than 20 types of tumor have been differentiated: 20.4 per cent were spindle cell sarcoma; 7 per cent rhabdomyosarcoma; 7 per cent mixed cell sarcomas; 6 per cent leiomyosarcoma; 8 per cent myxosarcoma; 3 per cent angiosarcoma; 6 per cent lymphosarcoma; and 1 per cent fibrosarcoma. Rhabdomyosarcoma is spindle cell sarcoma with myxomatous tendencies. Specific fusiform, round, or tubular elements representing various stages of differentiation of striated muscle fibers are found in variable numbers. In their absence it is difficult to distinguish between spindle cell sarcoma and myosarcoma.

In the case under observation large, multinucleated, bizarre-shaped, rhabdomyosarcoma cells were present in the prostate tissue. In sections through the prostatic urethra clusters of extremely large cells were found which stained acidophilic, as well as many foci of round cell infiltration usually located in the perivascular tissues and fat. This tumor was said to be probably of smooth muscle origin, with differentiation in the direction of striated muscle. However, according to Katzen, Cohen, and Steiner the prostate gland also contains a small amount of striated muscle continuous with the sphincter urethrae membranaceae. Rhabdomyosarcomata may therefore possibly arise from this tissue, rather than from a theoretical congenital rest, as has been assumed by certain writers.

Early symptoms are usually bladder neck obstruction, resembling benign prostatic hypertrophy. Pain in the legs appears rather early. The growth of tumor is rapid; extension into the perineum is associated with resultant bulging in this area. Bladder involvement results eventually in hematuria. Cytoscopic examination will usually disclose forward and upward displacement of the bladder. Variation in the size of the prostate is characteristic. Finally necrosis and hemorrhage become apparent.

8 figures, 1 table. Bibliography of 33 references.

Transurethral Surgery in 1944.

J. L. EMMETT, E. N. COOK, T. L. POOL, and L. F. GREENE. *Proc. Staff Meet. Mayo Clin.,* 20:469-72 (Nov. 28), 1945.

The greater part of transurethral surgery continues to be made up of transurethral prostatic resections. There has been little change in the

PURODIGIN now costs no more than preparations of whole digitalis leaf.

Facts ON PURODIGIN

REG. U. S. PAT. OFF.

PURODIGIN contains the highly purified glycoside, digitoxin ($C_{41}H_{64}O_{13}$)—"first in the choice of digitalis materials for general therapeutic use."—Gold et al., J. Pharmacol. 82:187, 1944.

PURODIGIN is approximately 1000 times as potent in man as digitalis leaf.

PURODIGIN is safe. The ratio of therapeutic dose to toxic dose is the same as in the case of digitalis.

PURODIGIN is rapidly and completely absorbed following oral administration.

PURODIGIN is well tolerated. Small dosage and complete absorption minimize gastrointestinal irritation.

PURODIGIN dosage is based on weight, eliminating the confusion of biologic units.

Digitalization can be accomplished with 1.2-1.5 mg., in single or divided doses.

Digitalization can be maintained in most patients with a dose of 0.2 mg. per day.

PURODIGIN is the first American-made digitoxin.

0.2 mg. tablets, vials of 30 and bottles of 100.

0.1 mg. tablets, bottles of 100.

Wyeth
REG. U. S. PAT. OFF.

WYETH INCORPORATED • PHILADELPHIA 3 • PA.

technique used in this operation. Reference is made therefore to a previous report by J. L. Emmett: Transurethral Resection and Open Prostatectomy: A Consideration of Ten Years of Experience with Transurethral Resection (Surg., Gynec. & Obst., 79:449-56, Nov. 1944).

The results are highly satisfactory, and the evidence is convincing that transurethral prostatic resection is the procedure of choice for removing obstructing enlargements of the prostate gland. In 1944, 94 per cent of transurethral prostatic operations were completed in one stage. More than 3.8 per cent of the patients were 80 years of age or older; the average age was 66. The mean length of postoperative hospitalization was 8½ days. Only 7.6 per cent were confined to the hospital for three weeks. Of the total, 82 per cent were operated on without preliminary drainage; the remaining 18 per cent were prepared by urethral catheterization. The operative mortality rate was 1.3 per cent.

Transurethral resection of the vesical neck for urinary retention, caused by injuries of the spinal cord, deserves special attention. The results of such operations have also been most gratifying.

In 1944, 171 patients with carcinoma of the prostate gland underwent transurethral resection at the Mayo Clinic. Bilateral orchectomy was performed in 17 cases. It was advised only when metastasis was present.

One of the most important procedures in transurethral surgery is transurethral manipulation of urethral calculi. The Johnson, Councill, and Howard spiral extractors are the three-stone extractors employed in this work. Only stones in the lower third of the ureter are considered suitable for manipulation. A catheter or extractor should never be forced past the stone. If the instrument cannot be passed other means should be employed. Sometimes if a 4 F. or 5 F. catheter is left in place for 24 to 48 hours enough dilatation may be obtained for passage of the extractor.

If the stone is impacted the roof of the ureter may be excised with the Collings knife through the McCarthy panendoscope, using the indwelling ureteral catheter as a guide.

It is unusual to encounter a stone so large that it cannot be crushed with the Bigelow type of lithotrite. In 1944 litholapaxy was successfully carried out in 56 cases at the Mayo Clinic.

Transurethral Resection of the Prostate by Means of the Cold Punch.

(La resección transuretral de la prostate con el cold punch.) J. Bisquertt Torres. *Sexto congr. chileno cirug.* (1944), 6 (1945), 445-53.

The resectoscope for direct vision, according to Thompson, and the operative technique of the resection are discussed. Preferably the anesthesia is produced by means of procaine hydrochloride in doses of from 70 to 90 mg., dissolved in 2 cc. of cerebrospinal fluid injected at the third or fourth vertebra. If a second resection should become necessary, generally from 5 to 7 days after the first, pentothal sodium is used.

The main requisites enabling the urologist to make a perfect resection are a sufficiently good urethral caliber and a meatus through which the resectoscope will slide easily. The postoperative presence of clear urine without vesical residues authorizes the physician to discharge the patient.

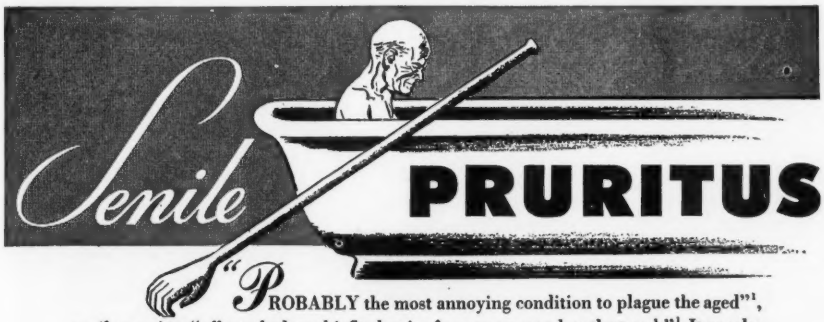
COMFORT - *The Yardstick by which your Cardiac Patient Measures his Progress*

THEOCALCIN (Council Accepted) helps bring comfort to cardiac patients by promptly reducing edema, diminishing dyspnoea and strengthening heart action. Theocalcin is given orally in doses of 1 to 3 tablets, t. i. d.

Theocalcin is a well tolerated Diuretic and Myocardial Stimulant.
Available in 7½ grain tablets and in powder form.

Theocalcin, brand of theobromine-calcium salicylate.
Trade Mark Reg. U. S. Pat. Off.

BILHUBER-KNOLL CORP. ORANGE, NEW JERSEY.



"PROBABLY the most annoying condition to plague the aged"[1], senile pruritus "affects the legs chiefly, but is often pronounced on the trunk"[1]. It may be greatly alleviated by appropriate topical therapy. • ALMAY TAR BATH has been endorsed for this purpose by leading dermatologists[2,3]. A superior mild tar medicament, it is anti-pruritic, quickly water-miscible, and will not discolor the hair, skin or bathtub. ALMAY TAR BATH has also proved efficacious in the treatment of *eczematous dermatoses* and *psoriasis*. • Use two to four tablespoonfuls in a tub of water in which the body should be submerged for about ten minutes. The room, water and towel should be at body temperature.

ALMAY, INC., 56 COOPER SQUARE, NEW YORK 3, N. Y.

SOLE DISTRIBUTORS: **Schieffelin & Co.** NEW YORK 3, N. Y.

REFERENCES: 1. Stieglitz, E. J., Geriatric Medicine, 1943, p. 848;
2. Sulzberger, M. B., Dermatologic Allergy, 1940, p. 470;
3. Sulzberger, M. B. and Wolf, J., Dermatologic Therapy in General Practice, 1942, p. 23, 482.

ANTI-PRURITIC . . . DETERGENT

ALMAY *Tar Bath*

ARROW BRAND

• WHEEL CHAIRS
• FOLDING CHAIRS
• COMMODES

VARIETY

Reclining and Folding Chairs at reasonable prices —Chairs with commodes, removable arms, or for out-of-doors — Chairs that fold compactly for traveling.

Model 512
Folding Chair
•
Write for details

However, the existence of residua does not necessarily contraindicate a discharge in cases of large atonic bladders requiring special medication and time to regain tonicity.

The Aged Get Well, Too.

HARRY HYMAN. *The Modern Hosp.*, 66:87-88 (Feb.), 1946.

The author, superintendent of a convalescent home, points out that such homes will receive an increasing number of calls to care for the aged. He recommends grouping older patients, with group dormitory and dining facilities. Old age often brings with it harmless eccentricities and extreme habituation that are noticed in the family group but are ignored in a group of older people. The recreation room should be common to both younger and older patients. Recommendations are made regarding recreation, crafts, diet, physical therapy, equipment, and facilities for the aged.

The administrator must use all his energy, tact, understanding, and sympathy in dealing with older patients.

22.8% OF PERSONS 65 YRS. OF AGE AND OVER HAVE DISABLING DIGESTIVE DISEASES*

In the treatment of CONSTIPATION in the aged and aging

KONSYL

PROVIDES A RATIONAL REGIME USED SUCCESSFULLY BY MANY LEADING PHYSICIANS

A teaspoon makes a tumbler of "jelly".

KONSYL promotes peristalsis by water retention and lubrication—and especially important with elderly people, will not irritate even the most sensitive gastro-intestinal lining. It is an effective lubricant, easy to swallow and does not interfere with the digestive process.

KONSYL is the original concentrated vegetable mucilloid made from Plantago Ovata. It is non-habit forming, causes no leakage and is priced exceptionally low. Aged patients who have had difficulty with bowel movements for years will be delighted with the normal, easy elimination they receive with KONSYL. **Write for clinical test sample and literature.**

**Source—National Health Survey, U. S. Public Health Service, 1935-6.*

SERVING PHYSICIANS SINCE 1885

BURTON, PARSONS & COMPANY
Washington, D.C.